PROJECT REPORT

ENVIRONMENTALLY DANGEROUS WASTE IN THE SAN FRANCISCO BAY AREA:

ASSOCIATION OF BAY AREA GOVERNMENTS

ABAG

F I N A L

PROJECT REPORT

ENVIRONMENTALLY DANGEROUS WASTE IN THE SAN FRANCISCO BAY AREA:

Land Disposal and Its Alternatives

PREPARED BY
ASSOCIATION OF BAY AREA GOVERNMENTS
UNDER TERMS OF CONTRACT NO. S6-041-76
WITH THE STATE SOLID WASTE MANAGEMENT BOARD

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This report is funded by the State Solid Waste Management Board as part of the Phase II work of the Bay Area Solid Waste Management Project (BASWMP).

With the adoption of Assembly Concurrent Resolution 79 in September, 1975, the Legislature recognized potential problems associated with the safe and proper disposal of environmentally dangerous wastes and requested the State Solid Waste Management Board to study the problems.

Subsequently, in the BASWMP-Phase I report, the following task was recommended:

> *3.c. Develop EDW disposal strategies*

This report satisfies the above recommended task.

In addition, this report reaffirms and supports the following conclusion included in that report:

1. *Current data on environmentally dangerous waste quantities are insufficient to confirm the belief held by some that the Class I facilities' problem can be solved by providing more and better located facilities.*

INTRODUCTION

SUMMARY

This report is divided into three parts:

I-General assessment of land disposal of hazardous waste

II-Evaluation of potential Class I site areas in the Bay Area

III-Process for verifying the acceptability of potential Class I sites

Part I discusses the impacts of land disposal of hazardous wastes, of increased waste reduction and resource recovery and of detoxification of wastes. Important findings of this impact analysis include:

- Continued use of existing landfill and waste disposal techniques is the only viable method of dealing with hazardous wastes in the immediate future due to the time and money required to implement aggressive waste reduction, source separation and waste detoxification programs.

- Resource recovery and waste reduction and detoxification will become more environmentally sound hazardous waste management methods than landfilling in the long run.

- Landfills probably can never be abandoned, even in the long run, for burial of wastes for which resource recovery alternatives are not yet available or where technological difficulties or high costs make alternatives unfeasible.

Given the necessity for landfills described in Part I, additional Class I disposal sites may be required. Part II describes the process used in and results of a project that evaluated potential Class I site areas identified in earlier work of ABAG's Environmental Management Program. Most of the potentially acceptable areas identified were in Solano, Contra Costa, Alameda and Napa Counties.

Part III describes the types of studies that are necessary to verify the suitability of potential Class I sites, the process of confirming site acceptability, and the typical costs of the required studies. The political process of confirming site acceptability, though probably the most important aspect of this process, is beyond the scope of this report.

A strategy for hazardous waste management in the Bay Area should:

- ensure adequate disposal capactiy
- emphasize waste reduction and resource recovery for the long-term
- mitigate, to the extent possible, the effects of relying on Class I site disposal

The State Department of Health, State Solid Waste Management Board, California Pollution Control Authority, and ABAG all have a role in implementing these policies.

NATURE OF HAZARDOUS WASTES

For the purposes of this report, "environmentally dangerous waste" is used as a synonym for "hazardous waste." Statutes define "hazardous waste" in a variety of ways.

For example, the California Hazardous Waste Control Act of 1972 (Section 25117) uses "hazardous waste" to mean:

> ... any waste material or mixture of wastes which is toxic, corrosive, flammable, an irritant, a strong sensitizer, which generates pressure through decomposition, heat or other means, if such a waste or mixture of wastes may cause substantial personal injury, serious illness or harm to wildlife, during, or as a proximate result of any disposal of such wastes or mixture of wastes. The terms "toxic," "corrosive," "flammable," "irritant," and "strong sensitizer" shall be given the same meaning as in the California Hazardous Substances Act...

The Act also contains this definition of "extremely hazardous waste" in Section 25115:

> ... any hazardous waste or mixture of hazardous wastes which, if human exposure should occur, may result in death, disabling, personal injury or illness during, or as a proximate result of, any disposal of such waste or mixture of wastes because of its quantity, concentration, or chemical characteristics.

On the other hand, the Federal Resource Conservation and Recovery Act of 1976 contains this definition:

> ... a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may -
> (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness, or
> (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

The State definition has been used for this report.

In addition, "hazardous waste disposal sites" is used synonymously with "Class I sites." It should be noted that "Class I sites," as defined by the State Water Resources Control Board, "are those at which complete protection is provided for all time for the quality of ground and surface waters from all wastes deposited therein and against hazard to public health and wildlife resources."

Hazardous wastes are chemical or biological in origin. They may be a by-product of a production process or may result from production malfunctions or spills in transport. Radioactive wastes are not included in this discussion.

The hazardous waste management system consists of three main stages:

- generation and storage
- transportation, including collection and transfer
- disposal

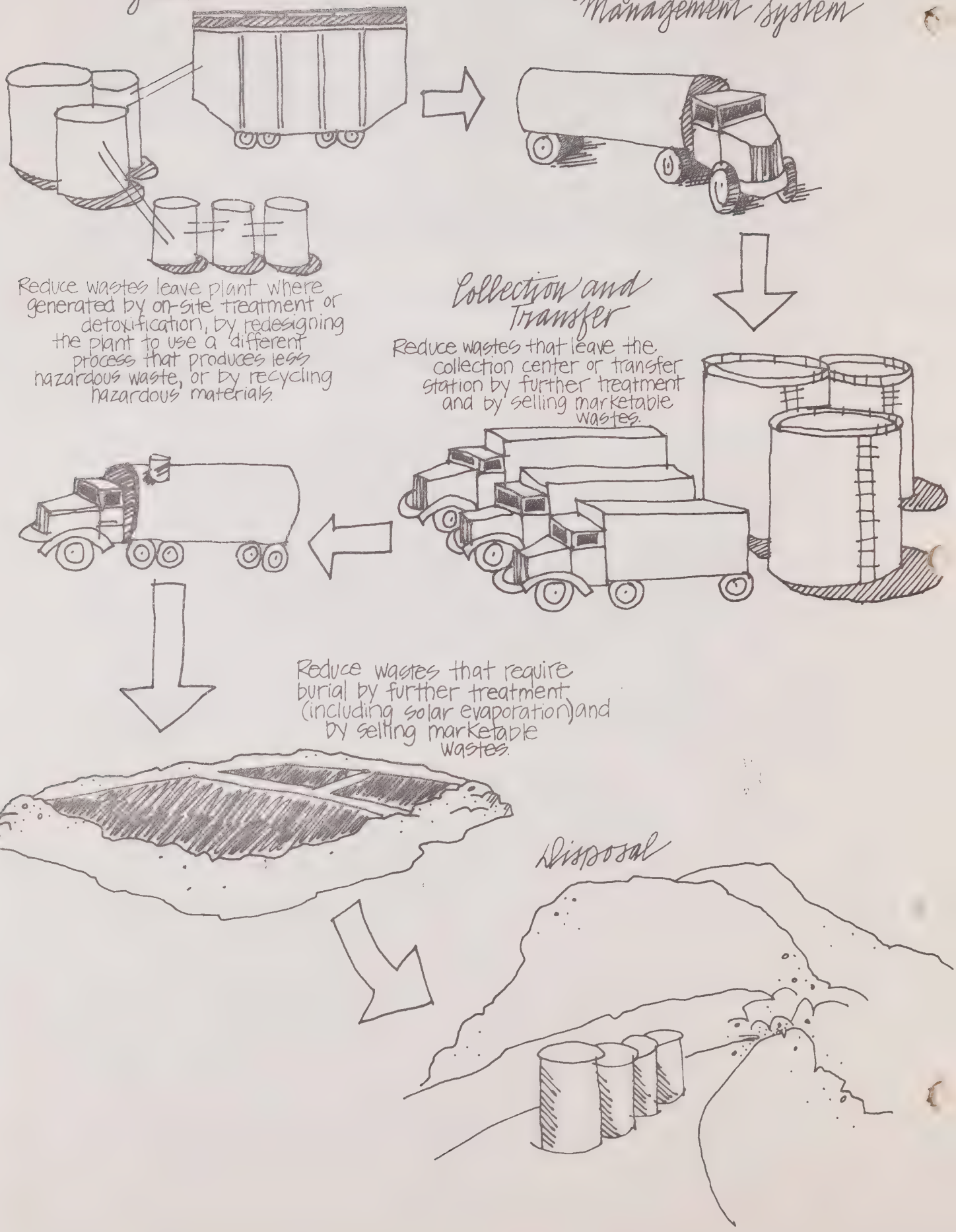
The amount of hazardous wastes that are landfilled can be reduced by detoxification, process modification and resource recovery during any of these three stages. Figure 1, below, illustrates the relationships between the three stages of the management system and the ways in which the amount of materials that can require disposal can be reduced.

At the present time, all of these methods of reducing hazardous wastes and landfilling of hazardous wastes are occurring. The extent to which each is being practiced during generation is not known precisely. Much more treatment and resource recovery is occurring at Class I sites prior to disposal than in Southern California, however.

Further information on the hazardous waste management system in the Bay Area is described in Solid Waste Management Brief #3, included as Appendix A, and in the four Technical Memoranda listed in the reference section on page 21.

FIGURE 1:

The Hazardous Waste Management System



PART I - GENERAL ASSESSMENT OF LAND DISPOSAL OF HAZARDOUS WASTES

INTRODUCTION

Various ways of reducing the amount of hazardous materials that require disposal to land have been proposed, including:

- reducing the amount of hazardous wastes that are generated,
- increasing the amount of wastes that are reused through increasing separation of wastes when they are generated or waste exchanges, and
- increasing waste treatment and detoxification where generated, at transfer stations, or at the Class I site prior to disposal.

The tables that follow summarize the environmental, institutional/financial, economic and social impacts of these schemes and, for comparative purposes, of continued reliance on land disposal in Class I sites.

At the present time, all of these methods of managing hazardous wastes are occurring. Information on the extent to which each method is used is not available. The tables are meant to show the impacts of significant changes in the use of a particular tool for reducing wastes going to landfills. The impacts of treatment and processing of wastes at Class I sites prior to disposal are included in the table for disposal because such processing is commonly used in the San Francisco Bay Area at the present time.

These tables have been prepared using the ABAG Surface Runoff Assessment Procedures Manual (1977). The checklist from that report is included as Appendix B. The distinctions between insignificant and significant impacts as well as between positive and negative impacts are not made because this subjective evaluation is better left to the user of the tables.

TABLE 1: COMPARATIVE IMPACTS OF FOUR TYPES OF HAZARDOUS WASTE MANAGEMENT PRACTICES

A - Impacts of Reliance on Land Disposal at Class I Sites

ENVIRONMENTAL IMPACTS (Impacts are site specific)	INSTITUTIONAL/FINANCIAL IMPACTS (on the public sector)	ECONOMIC IMPACTS (on the private sector)	SOCIAL IMPACTS
Air Quality • Impacts; solar evaporation ponds may have some odor. Extent of the odor depends on how well the site is operated. Burial activities may lead to increased dust. Ponds also may emit volatile toxic gases, but are monitored by the Bay Area Air Pollution Control District. Land spreading and soil biodegradation can cause air pollution and the generation of potentially toxic fumes. Water Quality • Impact; possible improvement in water quality if new site is established to replace an existing site with water quality problems (assuming proper location and management of future sites). Physical Resources • If new sites are needed, there may be impacts on flora and fauna, agricultural land, mineral extraction and timber lands. Effects could be minimized in the site selection process. • Adequate disposal capacity and practices provides protection of physical resources. Energy • Fuel is used to transport waste to landfill site. Amenities • If new sites are needed, there may be a reduction of the visual amenities of the chosen site(s). • If new sites are needed, site preparation activities, traffic associated with disposal, and on-site operations would result in increased noise levels.	Financial • If financed publically, new sites may be financed by local government bonds or by increases in property taxes. • If new sites are private, they will be an additional industry to be taxed, as are existing sites. • Probable revenue to the jurisdiction from development and construction fees from new sites. Institutional • The reaction of communities and environmental groups depending on the location of new sites will lead to poor public acceptability. • Industry and labor groups may encourage designation of new sites. • Governments may have difficulties in selecting new sites due to the sensitive nature of the decision.	Direct Cost-Private • No increase in cost of hauling and disposal in the short-term; possible long-term impact if hauling costs increase if new sites are farther away, or if disposal fees increase. Production of Goods and Services • Impact on the number and location of industries that depend on Class I sites for disposal of their hazardous wastes if new sites are needed. • Employment - Temporary construction employment and more permanent employment in operating sites could result. Income and Investments • Property chosen for sites could increase in value due to speculation of income from site acquisition; surrounding property could decrease in value due to expected adverse impacts on air quality and amenities. • Impact on capital investments by requiring an investment in land and equipment for Class I sites by the owner or operator of the facities. • Possible impact on the profits of existing competing Class I site owners and operators since revenue would be spread to include any new site(s). Consumer Expenditures • Impact on disposal rates at Class I sites related to profits of site owners and operators.	Housing Supply • No impact Physical Mobility • No impact Health and Safety • Adequate disposal capacity of Group I (hazardous) wastes provides protection of public health by discouraging improper disposal. • If new sites are needed, the longer distances for wastes to be transported increases the possibility of spills. Urban Patterns • Possible indirect impact on land use by restricting the use of any newly designated site and of adjacent areas. Sense of Community • No impact if sites are sufficiently removed from urban areas. Equity • No impact

TABLE 1 (CONTINUED)

B - Impacts of Aggressive Programs to Encourage Reduction of Hazardous Wastes

ENVIRONMENTAL IMPACTS (Impacts are site specific)	INSTITUTIONAL/FINANCIAL IMPACTS (on the public sector)	ECONOMIC IMPACTS (on the private sector)	SOCIAL IMPACTS
Air Quality • Indirect impact on dust and odors due to reduced need for land disposal and processing or treatment. • Possible changes in the emissions of waste generators due to process changes. Impact cannot be predicted.	Financial • Direct Cost-Public - possible cost of providing incentives and other encouragements.	Direct Cost-Private • Possible cost of modifying processes and plants; potential long-term reduction of disposal costs.	Housing Supply • No impact
Water Quality • Possible indirect impact on water quality due to reduced need for land disposal. • Possible increase in illegal dumping which should be minimal if waste reduction is not mandated. • Possible changes in the production of non-hazardous wastewater due to process changes. Impact cannot be predicted.	Institutional • May be unpopular with generators and labor due to perceived costs and reluctance to change; popular with environmental groups. • Possible indirect cost of increased policing of generators which should be minimal if waste reduction is not mandated.	Production of Goods and Services • Impact on production as process changes are made; possible long-term impact as savings are realized. Income and Investment • Possible minor to significant investments by industry in new equipment depending on commitment to waste reduction and type of process involved; may need to be publically encouraged with tax incentives and low interest loans. • Possible short-term reduction of profits due to investments. Consumer Expenditures • Possible indirect impact on cost for consumer.	Physical Mobility • No impact Health and Safety • Impact on public health by reducing the amount of hazardous wastes to be managed and transported. • Possible impact due to potential increase in illegal dumping which should be minimal if waste reduction is not mandated. Urban Patterns • No impact Sense of Community • No impact Equity • No impact
Physical Resources • Impacts on hazardous waste by reducing quantity of hazardous wastes generated, by reducing volume required for storage, collection, and hauling, by prolonging life of existing Class I sites and reducing the need for additonal sites. • Impact on raw materials if increased reuse of materials. • Possible increase in water used to dilute wastes which should be minimized if waste reduction is not mandated. • Possible changes in the use of resources due to process changes. Impact cannot be predicted.			
Energy • Possible changes in the use of energy. Impact cannot be predicted. Fewer trucks will be used to transport wastes; new processes may require either less or more energy.			
Amenities • No impact			

TABLE I (CONTINUED)

C - Impacts of Increased Resource Recovery (Including Source Separation and Resource Exchange)

ENVIRONMENTAL IMPACTS (Impacts are site specific)	INSTITUTIONAL/FINANCIAL IMPACTS (on the public sector)	ECONOMIC IMPACTS (on the private sector)	SOCIAL IMPACTS
Air Quality • Indirect impact on dust and odors due to reduced need for land disposal.	Financial • Possible indirect cost of providing incentives.	Direct Cost-Private • Same as waste reduction alternative.	Housing Supply • No impact
Water Quality • Possible indirect impact on water quality due to reduced need for land disposal.	Institutional • May be unpopular with generators and labor groups due to perceived costs and reluctance to change; popular with environmentalists. Industry has, however, responded favorably to the pilot program of the California State Department of Health. • Some incentives may require enabling legislation, including any tax law changes.	Production of Goods and Services • Possible impact on production due to less use of virgin materials. • Employment - Potential impacts on employment by slightly increasing jobs at resource recovery facilities and decreasing jobs in production of virgin materials. Possible net job increase.	Physical Mobility • No impact
Physical Resources • Impact on hazardous waste by changing industrial operating practices and thereby encouraging resource recovery. • Impacts on hazardous waste -- may alter the amount of waste going to landfills, may require additional source separation, may increase the life of existing Class I sites. • Possible reduction in consumption of raw materials. • Changes in production processes may change the use of materials.		Income and Investment • Possible impacts on capital since may result in purchasing resource recovery facilities by industries that generate hazardous waste. However, many wastes can be exchanged with little or no processing. • Profits may result from sale of reusable materials. • Possible short-term reduction of profits due to investments; potential long-term increases from decreased costs for disposal and for raw materials.	Health and Safety • On-site recycling has an impact on public health by reducing the amount of hazardous wastes to be managed and transported. • If off-site recycling changes the distance to be transported from that to Class I sites, the possiblity of spills may increase or decrease, depending on whether the distance increases or decreases. • Reduces the amount of hazardous wastes to be disposed of at Class I sites.
Energy • Possible changes in the use of energy. Impact cannot be predicted.		Consumer Expenditures • Unknown indirect impact on cost related to cost to industry. • Products bought may use less virgin materials and more reclaimed materials.	Urban Patterns • No impact if recycling occurs in existing industrial areas.
Amenities • No impact			Sense of Community • No impact if recycling occurs in existing industrial areas.
			Equity • No impact

TABLE 1 (CONTINUED)

D - Impacts of Increased Waste Treatment or Detoxification

ENVIRONMENTAL IMPACTS (Impacts are site specific)	INSTITUTIONAL/FINANCIAL IMPACTS (on the public sector)	ECONOMIC IMPACTS (on the private sector)	SOCIAL IMPACTS
Air Quality • Possible changes in particular types of emissions due to treatment and detoxification. Impact cannot be predicted. Water Quality • Possible changes in the production of non-hazardous wastewater due to treatment and detoxification. Impact cannot be predicted. Physical Resources • Impacts on hazardous waste since may alter the amount of waste going to landfills, may increase the life of existing Class I sites, and may reduce the need for more Class I sites Energy • Possible changes in the use of energy. Impact cannot be predicted. Amenities • No impact	Financial • Direct Cost-Public No impact Institutional • May be relatively popular with environmentalists as well as generators and labor groups.	Direct Cost-Private • Possible cost of waste treatment and detoxification equipment. Potential long-term reduction of disposal costs. Production of Goods and Services • Possible changes in production. Impact cannot be predicted. Income and Investment • Possible investments by industry in new equipment. • Possible changes in profit. Impact cannot be predicted. Consumer Expenditures • Possible changes in cost for consumer. Impact cannot be predicted.	Housing Supply • No impact Physical Mobility • No impact Health and Safety • Impact on public health by reducing the amount of hazardous wastes to be managed, transported and disposed of. Urban Patterns • No impact Sense of Community • No impact Equity • No impact

ASSESSMENT CONCLUSIONS

As can be seen from the preceeding tables, the environmental effects and improvement in public safety of aggressive programs to encourage reduction of hazardous wastes and of increased resource recovery (including source separation and resource exchange) are superior to landfills. However, the lead-time for construction and the costs of new production facilities and equipment make substantial reliance on these alternatives unfeasible on a short-term basis. Continued use of existing landfill and waste disposal techniques seems to be the only viable method of dealing with hazardous wastes in the immediate future. Treatment and detoxification of wastes prior to their disposal to land can substantially lessen the potential water quality and public health and safety impacts of landfilling. The economic impacts of such a strategy are much less severe than of resource recovery and waste reduction, making it a viable short-term tool.

PART II - EVALUATION OF POTENTIAL CLASS I SITE AREAS IN THE BAY AREA

INTRODUCTION

Given the necessity for landfills described in Part I, additional Class I disposal sites may be required in the future. Therefore, potential site areas in the Bay Area should be identified for planning purposes. Several such general areas were identified for further investigation in earlier work of ABAG's Environmental Management Program (EMP). The evaluation that follows should be viewed only as a screening of the entire Bay Area--not as a site-specific investigation.

Potential Class I site areas were identified using two types of criteria:

- Strict hydrologic and geologic criteria
- Gradational hydrologic and geologic criteria

The evaluation performed under this contract added a third type:

- Area acceptability criteria

The strict criteria eliminate those areas that are geologically unsuitable for sites. The gradational criteria flag those remaining areas as most likely, moderately likely, or not likely to be found suitable. The acceptability criteria attempt to flag limitations of sites that are not related to hydrology or geology, or limitations that must be examined on an area by area basis (Table 2).

Significant findings of the evaluation include:

- About 925 square kilometers of land (over 350 square miles) in the Bay Area meet the strict hydrologic and geologic criteria.
- Of this area about 500 square kilometers are unacceptable because they are in or near urbanized areas or failed to meet one or more of the other acceptability criteria. Approximately 260 square kilometers are only marginally acceptable and 140 square kilometers are potentially acceptable.
- Most of the potentially acceptable areas are in Solano, Contra Costa, Napa and Alameda Counties.

SUMMARY OF PREVIOUS WORK

The criteria used in the initial work of ABAG were adapted from those of the State Water Resources Control Board (1976) and others suggested by the U.S. Geological Survey (Hines, 1973). The State Water Resources

Control Board requires all Class I sites to have a natural barrier to prevent vertical movement of the wastes to usable ground water. Inundation, washout, faulting, liquefaction, landsliding, or accelerated erosion are not acceptable.

The U. S. Geological Survey suggests a variety of criteria be considered that deal with land resources and land use, land slope, flooding, surface water resources, precipitation, ground water resources, soil permeability, erosion, geologic materials, and earthquakes.

Because of the large amount of spatial information that needed to be considered, and because of the flexibility needed in varying the criteria, the newly developed computer-based Bay Area Spatial Information System (BASIS) was used to produce the needed maps. Maps were generalized into small boxes, or cells, where each cell was 1/4 square kilometer in size. The cell information was then combined according to the strict and gradational criteria.

TABLE 2: CLASS I SITES CRITERIA
(adapted from USGS and SWRCB)

STRICT CRITERIA

Out of flood prone areas
Not in areas which average greater than 30 inches of rain annually
Not in an earthquake hazard area
Not on unconsolidated geologic materials
Not on unstable materials or on greater than 15% slope

GRADATIONAL CRITERIA

Minimize amount of precipitation
Minimize likelihood of significant yield from wells
Prefer older rocks that are not granitic or part of the Franciscan Assemblage
Minimize soil permeability
Maximize relative slope stability and minimize soil erosion potential

ACCEPTABILITY CRITERIA

Not in or adjacent to developed areas or areas with development potential
Not publicly owned for parks, recreation, etc.
Not in ecologically sensitive areas
Not on or affecting regionally significant agricultural crops
Reasonably accessible for trucks
Maximize public and governmental acceptance
Prefer shales or oil bearing sandstones and avoid highly sheared materials
Setback from waters used for drinking and recreation

EVALUATION PROCEDURE

The first step in the evaluation process was to collect maps and other materials that could be used in applying the acceptability criteria. Table 3, below, lists those source materials for each criteria.

TABLE 3: SOURCE MATERIALS USED IN ANALYSIS

Acceptability Criteria	Source
Not in or adjacent to developed areas or areas with development potential	Developed lands and lands with development potential on ABAG Local Policy Survey Summary Map (1977) (Scale 1:125,000)
Not publicly owned for parks, recreation, etc.	Road maps (various scales); local plans when applicable
Not in ecologically sensitive area	USGS Topographic sheets (Scale 1:24,000) and report on Areas of Critical Environmental Concern (ABAG, 1976)
Not on or affecting regionally significant agricultural crops	General information from ABAG's San Mateo Coast Corridor Evaluation and Areas of Critical Environmental Concern reports
Reasonably accessible by trucks	Road maps (various scales) and ABAG base map (Scale 1:125,000)
Maximize public and governmental acceptance (to the extent possible prior to public workshops)	Discussions with selected county staff

Next, areas that were identified in the computer screening process were grouped for ease in applying the acceptability criteria. An attempt was made to group areas with similar social and environmental characteristics. These areas, and their corresponding letter code, are illustrated on Plate 1.

Tables were prepared summarizing the results of the evaluation procedure. Columns list:

- the letter code corresponding to the map area (A, B, C...) for each county
- the number of cells that passed the initial screening (strict criteria) as 1/4 square kilometer cells*
- the general location
- the present use
- adjacent use(s)

* Numbers are given as multiples of 1/4 square kilometers (approximately 62 acres) because the computerized maps used in this analysis are composed of small cells of information, each cell representing 1/4 square kilometer.

- transportation access
- nearest surface water
- other issues, including air quality problems, characteristics related to political acceptability, and problems with areas being scattered (not contiguous)
- a summary column for overall area acceptability

These tables are included as Appendix C.

EVALUATION RESULTS

The acceptable cells in Alameda County are in the vicinity of Altamont Pass. Those in Contra Costa County are in the east county on the edge of the Central Valley. Those in Napa County border the hills in the southern portion of that County. Those in Solano County are in the hills south of Vacaville, in the hills northwest of Fairfield, in the western Montezuma hills, in the hills near Suisun and Deverton, and in the hills north of Benicia and Vallejo.

Plate 1 illustrates the general location of the unacceptable, marginal, and possibly acceptable areas.

TABLE 4: AREA IN EACH COUNTY
UNDEVELOPED AND POSSIBLY ACCEPTABLE FOR USE AS POTENTIAL
CLASS I SITES (IN 1/4 SQUARE KILOMETERS)

COUNTY	TOTAL	URBAN OR PARK	DEV. POT.	UNDEV.	UNAC.	PROB. UNACEP.	POSSIBLY ACCEP.
ALAMEDA	295	69	17	209	128	77	90
CONTRA COSTA	613	184	86	343	284	186	143
MARIN	366	193	25	148	319	47	-
NAPA	651	4	72	575	545	15	91
S.F.	20	20	-	-	20	-	-
SAN MATEO	135	75	21	39	122	13	-
SANTA CLARA	310	26	111	173	296	14	-
SOLANO	575	32	87	456	262	95	218
SONOMA	729	34	160	535	288	434	7
TOTAL	3694	637	579	2478	2264	881	549

The generalized areas shown to be possibly acceptable should be the focus of any site-specific investigation as described in Part III. It is expected, however, that such investigations will not be started until better information on the quantities of hazardous waste expected to be generated is available and indicates that the capacity of existing Class I sites will be exceeded.

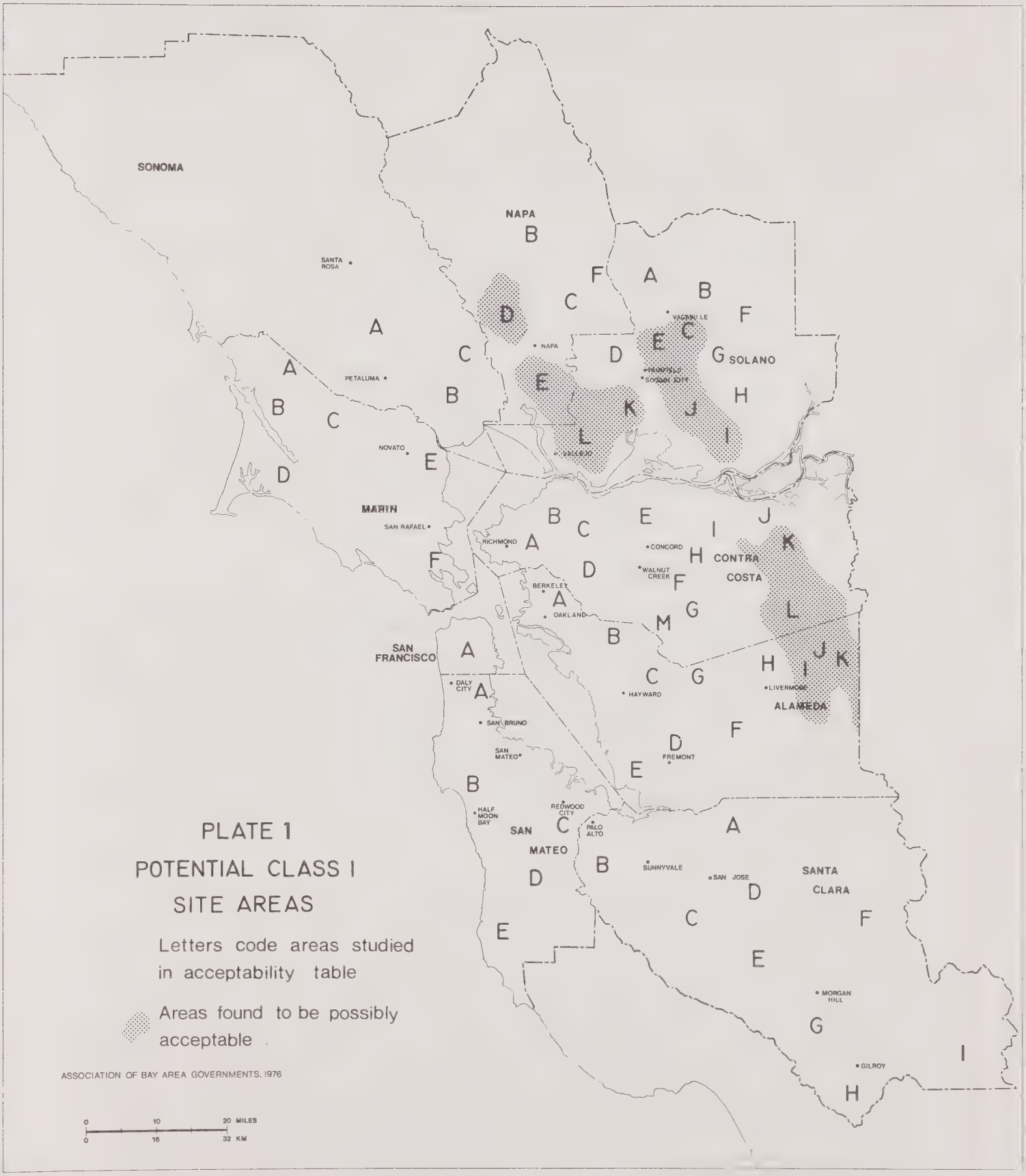


PLATE 1
POTENTIAL CLASS I SITE AREAS

Letters code areas studied in acceptability table

Areas found to be possibly acceptable .

ASSOCIATION OF BAY AREA GOVERNMENTS, 1976

0 10 20 MILES
0 16 32 KM

PART III - PROCESS FOR VERIFYING THE ACCEPTABILITY OF CLASS I SITES

INTRODUCTION

This portion of the hazardous waste report describes the results of two separate tasks related to verifying the acceptability of potential Class I sites:

- to develop an evaluation program for verifying the hydrologic and geologic acceptability of sites; and
- to discuss with consulting firms the current costs for necessary studies for verifying sites.

In addition, a discussion is included of the permit and review process.

Originally, the discussion was to be limited to needed site-specific analyses and technical review criteria suggested by other agencies. It has become obvious during the work that the problem of finding suitable Class I sites is not a technical one, but a social one. The contents of this part have been changed accordingly.

REVIEW CRITERIA FOR VERIFYING CLASS I DISPOSAL SITES

Several types of review criteria for use in verifying the acceptability of potential Class I disposal sites have been suggested by various groups. The most recent and most complete version of such criteria was developed by the Subcommittee on Criteria of the Federal Task Force for Hazardous Waste Management of the Western Federal Regional Task Force, Region IX. These criteria are included in this report as Appendix E. The hydrogeologic, biological, and land use and status criteria appear reasonably complete. However, the socio-economic criteria could be supplemented with additional information on public acceptance criteria and should be modified accordingly. Examples of data that help to indicate public acceptance include:

- Visual amenities
- Proximity to existing landfills or Class I sites
- Past experience with landfill operations

The applicant for a new Class I site will be required to prepare two separate reports that address the issues listed in the Criteria Report--(1) a geologic and hydrologic report, and (2) an environmental and social document (probably in the form of a draft Environmental Impact Report).

Many people mistakenly view these two reports as sufficient for verifying a disposal site. The process includes not only reports, but also the public workshops and hearings required to obtain the needed permits. Ultimately, the decision of where a site should be located is the responsibility of the people of the Bay Area, as expressed by their views at these meetings and by the votes of the elected officials. Admittedly,

such a process, if required, is time consuming. Ultimately, however, it is the only method of ensuring adequate landfill capacity if more landfill sites are necessary. More work is needed on handling this complex process. Any further work in this area is beyond the scope of this project.

The agencies that issue permits for hazardous waste disposal sites in the Bay Area are instrumental in the public approval process. They include:

Local Agency
Bay Area Air Pollution Control District
*Bay Conservation and Development Commission
*California Coastal Commission
Regional Water Quality Control Board
*State Lands Commission
State Department of Health
State Solid Waste Management Board
State Water Resources Control Board
*U.S. Army Corps of Engineers

In addition, the following agencies comment in the permitting process:

California Department of Fish and Game
U.S. Fish and Wildlife Service
Environmental Protection Agency

Excerpts from the Bay Area Permit Directory of Industrial Development (ABAG, 1977) pertaining to each of the permitting agencies, as well as additional information on the role of the State Department of Health and the State Solid Waste Management Board, are attached as Appendix D.

COSTS OF REQUIRED INVESTIGATIONS

The cost of preparing the hydrogeologic and the environmental/social reports and of the review process is awesome. During a recent survey of geotechnical consulting firms, ABAG staff asked those companies with experience in studying landfill sites the cost of the required hydrogeologic analyses. The firms indicated that this study alone can range from $40,000 to $100,000. The cost range is large since the costs depend so much on the size of the site and the complexity of the geology and soils. Even limiting the discussion to a hypothetical 150 to 200 acre site did not narrow the cost range significantly. In addition, company staff indicated that the cost of a study may double if the controverisal nature of the report tends to require more than the usual number of public hearings and further work to respond to questions. The environmental/social study will tend to cost an equivalent amount. The applicant will probably spend an additional $100,000 to $200,000 of staff time on the required supplementary reports and public meetings. Table 5, below, summarizes these costs to the applicant.

* Depending on location of proposed site

TABLE 5: COSTS TO THE APPLICANT OF VERIFYING THE ACCEPTABILITY OF A SITE FOR A CLASS I LANDFILL

	APPROXIMATE COST
HYDROGEOLOGIC REPORT	$ 40,000 - $100,000
ENVIRONMENTAL/SOCIAL REPORT	$ 40,000 - $100,000
IN-HOUSE STAFF TIME	$100,000 - $200,000
TOTAL	$180,000 - $400,000

The costs of any modifications to the site or site improvements after the necessary permits are issued would be in addition to these costs and cannot be estimated, even in general, because they are so dependent on the individual site.

In addition, there are public costs involved in the review process. These costs are very small compared with the costs to the applicant, however.

POLICY RECOMMENDATIONS

Ensure adequate disposal capacity

The number of additional landfill sites, if any, required depends on both the current and projected quantities of hazardous wastes and the capacity of existing landfills. Therefore, the following tasks must be performed:

- Survey the amount of hazardous industrial waste currently being generated, what these materials are and how they are currently being disposed of.
- Determine waste quantities that can be handled at each existing Class I site.
- Determine whether or not additional Class I sites are needed in the Bay Area.
- If additional disposal capacity for hazardous waste is needed, convene affected counties (those with industries needing Class I site capacity and those with areas potentially suitable for sites) to determine areas for further study and develop necessary intergovernmental and public/private arrangements for financing the studies, reports, public review and site(s) reservation and/or acquisition.

Emphasize waste reducion and resource recovery as a long-term management strategy

Possible measures to implement this policy are:

- Encourage industry to make changes in its processes and products to reduce the amount of hazardous waste generated.
- Encourage industry to avoid mixing wastes to facilitate recycling.
- Provide incentives to industry for resource recovery.
- Augment the State Department of Health's waste exchange programs.

Mitigate, to the extent possible, the effects of relying on Class I site disposal

Possible measures to implement this policy include:

- Encourage establishment of facilities designed to treat and detoxify wastes to lessen the impact of their disposal to land.

- Encourage the use of transfer stations in the southern Bay Area where no Class I sites currently exist and where no acceptable sites are likely to exist to more effectively manage the transportation of these materials.

AGENCY STRATEGIES

An effective role for the State Department of Health is outlined in AB 1593 (1977, amending Section 25170 of Chapter 6.5 of Division 20 of the Health and Safety Code). This section specifies that the State Department of Health:

- coordinate state-supported research on hazardous waste disposal
- maintain a technical reference center on hazardous waste disposal and recycling practices
- provide for appropriate surveillance of hazardous waste processing, use, handling and disposal
- undertake and coordinate recycling and recovery research pertaining to hazardous wastes
- determine existing and expected rates of hazardous waste production
- determine market potential and feasibility of use of hazardous wastes and resource recovery
- develop and institute incentives for recycling and resource recovery for hazardous waste

Both the California Pollution Control Financing Authority and the California State Solid Waste Management Board (through SB 650) can plan an important role in encouraging resource recovery and waste detoxification through allocation of the funds available to them. Priorities for this funding are contained in testimony by Yvonne San Jule included as Appendix F.

If new disposal sites are needed, ABAG's most effective role will be to maximize public acceptability by bringing the counties with disposal needs together with counties where disposal sites are available to work out a mutually agreeable solution to this multi-jurisdictional problem. Meanwhile, through its advocacy role, this agency can encourage waste reduction, recovery, and detoxification.

REFERENCES

Association of Bay Area Governments (ABAG), 1975, Areas of Critical Environmental Concern, 83pp.

ABAG, 1977, Existing Authorities for Hazardous Waste Management, Technical Memorandum No. 2, Solid Waste Management Plan, 10pp.

ABAG, 1977, Existing Practices for Solid Waste Management in the San Francisco Bay Area, Technical Memorandum No. 5, Solid Waste Management Plan, 13pp.

ABAG, 1977, Current and Projected Quantities of Hazardous Industrial Wastes Produced in the San Francisco Bay Area, Technical Memorandum No. 6, Solid Waste Management Plan, 10pp.

ABAG, 1977, Identification of Possible Class I Site Areas, Technical Memorandum No. 7, 36pp.

ABAG, 1977, Bay Area Permit Directory of Industrial Development, 62pp.

ABAG, 1977, Surface Runoff Assessment Procedures Manual, 103pp.

California State Solid Waste Management Board (CSSWMB), 1976, Disposal of Environmentally Dangerous Wastes in California, Report to the Legislature pursuant to Assembly Concurrent Resolution 79 in September, 1975, 47pp.

CSSWMB, 1977, Bay Area Solid Waste Management Project - Phase I, 183pp.

California State Water Resources Control Board, 1976, Waste Discharge Requirements for Nonsewerable Waste Disposal to Land: Disposal Site Design and Operation Information, 60pp.

Environmental Protection Agency, 1977, Report of the Federal Task Force on Hazardous Waste Management of the Western Federal Regional Task Force, Region IX, 128pp.

Hines, W. G., 1973, Evaluating Pollution Potential of Land Based Waste Disposal, Santa Clara County, California, U.S. Geological Survey Water Resources Investigation 31-73, 21pp.

APPENDIX A

SOLID WASTE MANAGEMENT BRIEF #3

ENVIRONMENTAL MANAGEMENT PROGRAM

ENVIRONMENTAL MANAGEMENT TASK FORCE

SOLID WASTE MANAGEMENT BRIEF #3

HAZARDOUS WASTE MANAGEMENT IN THE SAN FRANCISCO BAY AREA

JEANNE PERKINS
YVONNE SAN JULE
PETER CHIU

JULY 29, 1977

ASSOCIATION OF BAY AREA GOVERNMENTS

CONTENTS

HAZARDOUS WASTE BRIEF (SOLID WASTE MANAGEMENT BRIEF #3)

A. SUMMARY

This is the third of five briefs on the Solid Waste Management Program. It focuses on hazardous waste management in the Bay Area:

- o Responsibilities of Federal, State, regional and local agencies for hazardous waste management.
- o Existing and projected hazardous waste characteristics and production rates.
- o Existing hazardous waste management practices.
- o Problem areas being addressed in the Regional Solid Waste Management Plan.

Responsibility for insuring proper management of hazardous waste is shared by all levels of government. Under a number of Federal acts, the Environmental Protection Agency has primary responsibility for regulating management of hazardous wastes. At the State level, under both Federal and State statutes, lead responsibility for hazardous waste management rests with the State Department of Health. Regionally, the Regional Water Quality Control Board and the Bay Area Air Pollution Control District exercise controls over Class I landfills.

Responsibilities of local governments for hazardous waste management recognized by State and Federal statutes include planning, issuing permits for sites and facilities, operation (or franchising operation to private industry), encouraging reclamation of hazardous materials as an alternative to landfills, and enforcement of the standards for handling hazardous wastes set by the State Department of Health. Planning for hazardous waste management, including resource recovery and determination of the need for additional landfill capacity, requires accurate data about the quantities and types of wastes being generated. Currently, accurate information is only available for the amounts of wastes being delivered to Class I sites. In the Bay Area, only Alameda County--with a grant and technical assistance from the State Department of Health--has conducted an industry-by-industry survey to determine quantities of wastes being produced, reused and disposed of on-site.

Bay Area counties could not complete the hazardous waste components of the SB5 Plans because of the difficulty of obtaining information from industry, either to promote resource recovery or to determine the region's needs for additional landfill capacity. For these reasons, and because the existing disposal system is already regional (hazardous wastes from all nine Bay Area counties are disposed of in the Class I landfills in Contra Costa and Solano Counties), hazardous waste management was identified as a regional concern in seven of the nine Bay Area County Plans and by the nine-county solid waste plan coordination group.

The hazardous waste component of the Environmental Management Plan has as its objective:

> To work with the State Department of Health and the nine Bay Area counties to establish management of hazardous materials that ensures public health and safety, protects environmental quality and conserves resources.

The Plan will recommend actions that local governments can take together to improve management of these dangerous materials. Recognizing that State and Federal action is essential to substantial improvement, the Plan will also include an advocacy program for State and Federal legislative and administrative action.

EMTF Action

Recommended policies for hazardous waste management presented for EMTF approval:

- o Adequate planning for hazardous waste management requires accurate data on quantities and types of materials.
- o Waste reduction, source separation and recovery of hazardous industrial materials should be promoted toward limiting land disposal.
- o Regulations and enforcement should insure safe and proper handling and disposal of hazardous wastes.
- o Class I disposal sites and facilities should be located so that they do not have adverse effects on human health and safety, air and water quality, wildlife, critical environmental resources and urbanized areas.

B. STATEMENT OF THE PROBLEM

Examination of existing hazardous waste management practices indicates four problem areas.

1. Data Base

   - Accurate estimates of amounts of hazardous industrial wastes being produced cannot be made because of present data limitations.
   - County-by-county surveys will be necessary to develop better estimates of hazardous waste quantities being generated.
   - A more refined data base must be developed before accurate projections of future quantities can be made to facilitate hazardous waste management efforts, such as reclamation, and to determine Class I site needs.

2. Existing Handling Practices

   - Hazardous industrial wastes may be a by-product of a production process, may result from production malfunctions or from spills in transit.
   - Wastes may be stored improperly.
   - Existing housekeeping practices and economic considerations may lead to mixing of wastes and make them more difficult to reclaim.
   - Better coordination is needed in handling spills of dangerous materials.
   - Some infectious and pathological hospital wastes are disposed of at Class II sites with general household refuse.
   - In view of the requirements of the Federal Resource Conservation and Recovery Act, additional staff will be needed for adequate enforcement of hazardous waste management operations.

3. Resource Recovery

   - Support is needed for the much-needed waste exchange system that the State Department of Health has begun to establish.
   - Technology is available to recover many hazardous materials. However, hazardous waste recovery equipment can be very expensive and highly specialized. Having wastes hauled to disposal sites can be more convenient and is often cheaper.
   - Separate storage of waste materials can reduce the cost of recovery.

- o Support is needed for public education on recycled and recovered products.

- o Incentives for resource recovery are lacking.

4. Determination of Need for Additional Class I Sites

- o No determination of the need for additional landfills can be made until better information is available on quantities and the potential extent of resource recovery.

- o Pending a determination that additional site capacity is needed, the region should be screened to identify and reserve from development one or more sites which meet screening criteria for ensuring public health and safety and environmental protection.

- o Detailed criteria for verifying the acceptability of potential Class I site areas are needed.

These problem areas are highlighted in italics in the following text.

C. EXISTING AND PROJECTED HAZARDOUS WASTE CHARACTERISTICS AND PRODUCTION RATES

1. NATURE OF HAZARDOUS WASTES

It is recognized that a standardized definition of hazardous wastes is needed. At present, statutes define "hazardous waste" in a variety of ways. For example, the Federal Resource Conservation and Recovery Act of 1976 contains this definition:

> ...a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may -
> (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness, or
> (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

On the other hand, the California Hazardous Waste Control Act of 1972 (Section 25117) uses "hazardous waste" to mean:

> ...any waste material or mixture of wastes which is toxic, corrosive, flammable, an irritant, a strong sensitizer, which generates pressure through decomposition, heat or other means, if such a waste or mixture of wastes may cause substantial personal injury, serious illness or harm to wildlife, during, or as a proximate result of any disposal of such wastes or mixture of wastes. The terms "toxic", "corrosive", "flammable", "irritant", and "strong sensitizer" shall be given the same meaning as in the California Hazardous Substances Act...

The Act also contains this definition of "extremely hazardous waste" in Section 25115:

> ...any hazardous waste or mixture of hazardous wastes which, if human exposure should occur, may result in death, disabling, personal injury or illness during, or as a proximate result of, any disposal of such waste or mixture of wastes because of its quantity, concentration, or chemical characteristics.

Radioactive wastes are not included in this discussion. They are examined as part of the Industrial Dischargers Management Plan.

2. EXISTING WASTE PRODUCTION RATES BY SOURCE AND BY LOCATION

Accurate estimates of the amount of hazardous industrial waste cannot be made because of present data limitations. The best information currently available indicates that roughly 860,000 tons of hazardous industrial waste were produced in the Bay Area in 1976. Most of the wastes were in liquid form with varying densities and concentrations of hazardous substances. The 860,000 tons figure is based on the following estimates:

- o Wastes being disposed of at Class I sites - 376,700 tons
- o Wastes being disposed of on-site - 461,600 tons
- o Wastes being recovered - 9,100 tons
- o Waste being disposed of by other methods (including disposal to sewers and indiscriminate dumping) - 11,300 tons

These amounts are based on:

- o Statistics summary obtained from the State Department of Health computerized manifest system,
- o Results of a survey of on-site disposal conducted by the State Department of Health,
- o Results of a survey of hazardous industrial wastes in Alameda County conducted by the County Planning Department, and
- o Available information on amounts of wastes recovered.

The quantities of various types of hazardous wastes that were produced in the Bay Area counties and were disposed of at Class I sites in 1976 are shown in Table 1. The quantities of hazardous wastes received at the three Bay Area Class I sites in 1976 are summarized in Table 2. It should be noted that some of these wastes did not originate in the Bay Area.

The Federal Resource Conservation and Recovery Act of 1976 requires the generators of the hazardous wastes to adopt housekeeping practices that accurately identify the quantities of wastes generated. The Act further requires the owners and operators of hazardous waste treatment, storage, and disposal facilities to maintain records of all hazardous wastes being handled by the facilities. These requirements will be implemented within the next two years. *Until then, county-by-county surveys will be necessary in order to develop better estimates of hazardous waste quantities being generated.*

3. PROJECTED WASTE PRODUCTION RATES

It is estimated that the production of hazardous industrial wastes will increase about 5% annually. The range of increases could vary from 2 to 11%. These estimates were made after examining the possible effects of the following factors:

- o Production and consumption rates of manufacturing goods
- o Federal and state pollution control requirements
- o Legislative and market incentives and disincentives

Based on the estimated 1976 waste quantity and an annual rate of increase of 5%, 1985 waste generation is estimated to be 1.3 million tons.

A more refined data base is essential for projecting future quantities to facilitate hazardous waste management efforts, such as reclamation, and to determine Class I site needs.

TABLE 1. HAZARDOUS WASTES GENERATED IN THE BAY AREA AND DISPOSED OF AT CLASS I SITES IN 1976

County	Type of Wastes in Tons*																	
	Acid	Alkali	Pesti-cide	Paint Sludge	Sol-vent	Tetra Ethyl Lead	Chem Toi-let	Tank Bottom	Oil	Drill Mud	Con-tam. Soil	Can-nery Waste	La-tex Waste	Mud & Water	Brine	Other	Total** (by County)	% of Total
Alameda	7,416	21,883	94	4,296	1,840	19	5	714	3,815	19	5	0	286	765	126	8,842	50,100	13.3
Contra Costa	32,129	31,049	202	324	2,920	206	91	10,968	57,516	265	209	43	48	7,206	95	46,628	189,900	50.4
Marin	0	62	0	0	0	0	0	8	64	0	0	0	0	23	0	182	400	0.1
Napa	0	0	0	0	31	5	0	0	25	0	0	0	0	6	0	57	200	0.0
San Francisco	718	213	66	536	105	4	0	877	1,544	470	19	0	0	1,517	19	1,952	8,000	2.1
San Mateo	6,319	3,210	39	1,948	879	19	63	338	135	21	0	0	0	321	146	2,501	16,000	4.2
Santa Clara	6,411	12,289	139	3,363	2,822	20	23	223	927	0	0	0	184	721	0	7,346	34,500	9.2
Solano	11,304	42,527	116	66	252	0	0	325	1,753	0	0	0	0	1,071	0	15,275	72,700	19.3
Sonoma	2,825	29	0	0	23	0	0	334	0	0	0	0	19	802	0	887	4,900	1.3
Total** (by type of wastes)	67,100	111,300	700	10,500	8,900	300	200	13,800	65,800	800	200	100	500	12,400	400	83,700	376,700	
% of Total	17.8	29.5	0.2	2.8	2.4	0.1	0.1	3.7	17.4	0.2	0.1	0.0	0.1	3.3	0.1	22.2		100

*Assuming liquid waste has the same density as water (8.34 pounds per gallon).
**Rounded off to the nearest hundred tons.

Source: Manifest Summary of the State Department of Health

TABLE 2. HAZARDOUS WASTES DISPOSED OF AT THE BAY AREA CLASS I SITES IN 1976*

Site	Type of Wastes in Tons**																
	Acid	Alkali	Pesti-cide	Paint Sludge	Sol-vent	Tetra Ethyl Lead	Chem Toi-let	Tank Bottom	Oil	Drill Mud	Con-tam. Soil	Can-nery Waste	La-tex Waste	Mud & Water	Brine	Other	Total*** (by site)	% of Total
Martinez	24,562	62,098	215	1,637	5,677	271	140	6,482	63,999	255	147	43	274	6,759	204	61,694	234,500	58.1
Benecia	41,316	42,062	157	1,217	125	63	0	1,476	3,521	838	40	0	45	3,395	0	14,304	108,600	26.9
Richmond	6,272	9,794	2,491	8,604	4,089	88	105	8,265	2,854	13	413	0	291	2,801	182	14,291	60,600	15.0
Total*** (by type of wastes)	72,100	114,000	2,900	11,500	9,900	400	200	16,200	70,400	1,100	600	100	600	13,000	400	90,300	403,700	100%
% of Total	17.9	28.2	0.7	2.9	2.5	0.1	0.1	4.0	17.4	0.3	0.1	0.0	0.1	3.2	0.1	22.4		100%

*Some wastes were generated outside the Bay Area.
**Assuming liquid waste has the same density as water (8.34 pounds per gallon).
***Rounded off to the nearest hundred tons.

Source: Manifest Summary of the State Department of Health

D. EXISTING HAZARDOUS WASTE MANAGEMENT PRACTICES

1. EXISTING AUTHORITIES FOR HAZARDOUS WASTE MANAGEMENT

At least 28 statutes deal with various aspects of hazardous waste management, including planning, generation, packaging, transportation, disposal, and resource recovery.

Existing Federal statutes place primary responsibility for management of hazardous wastes on the Environmental Protection Agency (EPA). However, the Departments of Labor (DOL), of Health, Education and Welfare (HEW), and of Transportation (DOT), as well as the U.S. Coast Guard and the Nuclear Regulatory Commission (NRC), have special responsibilities.

State codes give the State Department of Health primary responsibility for setting standards and regulations for handling, processing, and disposal of these wastes. The Department also evaluates and coordinates research. The regional water quality control boards are charged with surface and groundwater quality; the air pollution control districts with protecting air quality; the Department of Fish and Game with protecting fish and wildlife; and the Department of Transportation with cleaning up spills. The State Solid Waste Management Board is authorized to coordinate solid waste management planning and to set minimum standards for sites and transfer/processing stations. The Board is also authorized to provide technical assistance.

The Federal and State statutes affecting the management of hazardous wastes are summarized in Tables 3 and 4 respectively.

2. EXISTING PRACTICES FOR GENERATION, STORAGE, TRANSPORTATION, DISPOSAL, AND PROCESSING OF WASTES

Hazardous wastes are chemical or biological in origin. The hazardous waste management system consists of four components: (1) generation and storage; (2) transportation, including collection and transfer; (3) disposal; and (4) processing, including resource recovery. It should be noted that processing and resource recovery can be part of the first three components.

In the following sections, existing management practices for hazardous wastes produced by industries, agricultural activities, and hospitals will be described.

a. INDUSTRIAL WASTES

- Waste generation and storage

Hazardous industrial wastes may be a by-product of a production process or may result from production malfunctions or spills in transport.

According to the Contra Costa and Santa Clara County Solid Waste Management Plans, most producers of large amounts of hazardous wastes take adequate precautions to protect their employees and

TABLE 3

FEDERAL STATUTES RELATED TO HAZARDOUS WASTE MANAGEMENT

	STATUTE	ADMINISTERING AGENCY	DESCRIPTION
a)	Resource Conservation and Recovery Act of 1976 (PL94-580)	Environmental Protection Agency (EPA)	Places primary responsibility to regu management of hazardous wastes on EPA
b)	Toxic Substances Control Act of 1976 (PL94-469)	EPA	Authorizes research and regulation of those substances found to be hazardous
c)	Section 112 of the Clean Air Act Amendments of 1970 (PL91-604)	EPA	Authorizes the setting of standards for hazardous air pollutants and controls the incineration of hazardous wastes
d)	Federal Water Pollution Control Act Amendments of 1972 (PL92-500)	EPA	Authorizes control over toxic pollutants discharged into water from point sources, the removal of toxic pollutants from critical port and harbor areas, and a plan describing the process for the disposal of pollutants
e)	National Environmental Policy Act of 1969 (NEPA) (PL91-190)	Not Specified	Requires the preparation of an environmental impact statement for all Federal hazardous waste management activities
f)	The Occupational Safety and Health Act of 1970 (OSHA) (PL91-596)	Department of Labor	Authorizes the setting of mandatory standards to protect people working with hazardous materials
g)	The Poison Prevention Packaging Act of 1970 (PL91-601)	Dept. of Health, Education, and Welfare (HEW)	Authorizes the establishment of special packaging standards for hazardous household substances
h)	The Federal Hazardous Substances Labeling Act of 1960 (PL86-613)	Dept. of Transportation (DOT)	Prohibits the transport of hazardous substances that have been misbranded or the labels have been removed
i)	Hazardous Materials Control Act of 1970 (PL91-458)	DOT	Authorizes an evaluation of the hazar associated with transporting hazardous materials
j)	Transportation of Explosive Act (U.S. Code, Title 18, ch.39)	DOT	Prohibits the unregulated transport of dangerous materials
k)	The Safety Regulation of Civil Aeronautics Act of 1958 (PL85-726)	Federal Aviation Administration of DOT	Authorizes FAA to develop air transportation standards to provide adequate safety
l	The Hazardous Cargo Act (U.S. Code, Title 46, ch.7)	U.S. Coast Guard	Places controls on the water transport of dangerous substances
m)	The Food, Drug and Cosmetic Act Animal Drug Amendments of 1968 (PL90-399)	Not Specified	Prohibits the misbranding of certain consumer items
n)	The Marine Protection Research, and Sanctuaries Act of 1972 (PL92-532)	EPA	Prohibits the transport for ocean dumping of many extremely hazardous wastes
o)	The Coastal Zone Management Act of 1972 (PL92-583)	Not Specified	Requires that coastal management agencies regulate hazardous waste disposal
p)	Section 212 of the Resource Recovery Act of 1970 (PL91-512)	EPA	Requests a study of the feasibility of a system of national hazardous waste disposal sites
q)	Safe Drinking Water Act of 1974 (PL93-523)	EPA	Authorizes regulation of underground injection of toxic wastes
r)	The Atomic Energy Act of 1954, as amended (PL83-703)	NRC and private industry	Authorizes the management of radioacti wastes generated in fission reactions
s)	The Armed Forces Appropriation Authorization Acts of 1969 and 1979 (PL91-121; PL91-441)	Not Specified	Limits the use of Federal funds for disposal of chemical and biological warfare agents
t	The Federal Environmental Pesticide Control Act of 1972 (PL92-516)	EPA	Requires the establishment of procedures and regulations for the disposal of pesticides

TABLE 4

ATE STATUTES RELATED TO HAZARDOUS WASTE MANAGEMENT

ATUTE	ADMINISTERING AGENCY	DESCRIPTION
Section 14040 and 13360 of the Porter-Cologne Water Quality Control Act and Subchapters 9.1, 15 and 23 of Chapter 3, Title 23, California Administrative Code	California Regional Water Quality Control Boards	Authorizes the setting and enforcement of waste discharge requirements for all disposal sites
Hazardous Waste Control Act of 1972	California Department of Health	Authorizes the development of regulations governing the handling, processing and disposal of hazardous wastes
vision 26 of the California Health fety Code	Bay Area Air Pollution Control District	Authorizes the monitoring of landfill sites and the enforcement of regulations pertaining to the control of air-borne hazardous wastes
Chapters 2 & 3, Division 7, Title 14 of the California Administrative Code	California Solid Waste Management Board	Authorizes the Board to coordinate solid waste management planning
Section 5651 of the Fish and Game Code	California Dept. of Fish and Game	Authorizes the requirement of the screening of ponds containing hazardous wastes
General Provisions of Divisions 1 and 2 of the Street and Highway Code	California Department of Transportation	Requires the Department to clean up spills of hazardous materials occurring on California roads
Article 23 of Group 2, Subchapter 1, Chapter 4 of the California Administrative Code	Agricultural Commissioner's Office of each County	Specifies the requirements of the State Department of Food and Agriculture pertaining to pesticide safety programs

public health as specified by the Occupational Safety and Health Act of 1970 (OSHA), although practices vary and are sometimes inadequate.

Most of the wastes are in liquid form. Tanks with a storage capacity of several days and facilities for transferring the wastes to tank trucks are usually provided. In addition, industries that produce a large amount of any given waste may be able to use it as a raw material in other manufacturing processes or sell it to another company for its reuse. *However, in many cases, because of convenience and economic considerations, wastes are mixed and cannot be reused or reclaimed readily.*

Smaller producers of hazardous wastes are more likely to create dangerous conditions. For example, wastes may be stored in 55-gallon drums that are not designed for such a purpose. Waste also may be stored for extended periods of time since the quantity needs to be large enough to make up a truckload.

o Transportation

Transportation of the wastes is usually handled through a contract with one of the liquid waste haulers in the region. Such haulers have to be registered by the State. There are over 600 haulers in California. The largest hauler in northern California is Industrial Trucking, Inc., a subsidiary of Industrial Tank, Inc. Some wastes are transported with in-house personnel and equipment.

Firms use vacuum trucks for transporting bulk non-corrosive liquids. For some corrosive materials, stainless steel vacuum trucks are needed. For others, specially lined non-vacuum trucks are needed. These trucks require special pumps. The ratio of vacuum trucks to steel or lined trucks is approximately 5 to 1. Flat bed trucks with side guards are used for transporting containerized materials. Mechanical loading is preferred for safety reasons.

Before the wastes can be transported on a public road, a Liquid Waste Haulers Form, or manifest, developed by the State Department of Health and the State Water Resources Control Board, must be filled out by the producer and the hauler. The producer lists the types of wastes that are to be hauled and the hauler then signs the form along with his license number for transporting wastes. Copies of the forms must be mailed to the State, where they are coded and entered in the computerized system of the State Department of Health.

The U.S. Department of Transportation also requires that the materials be properly labeled. According to one of its staff, the agency currently has adequate personnel for following up complaints and for spot checking. However, some critics believe that enforcement of existing regulations is inadequate.

Collected waste is usually transported directly to a Class I site in the east Bay Area. Some are transported to a transfer station in San Jose near Milpitas, however.

The transfer station, Industrial Environmental Services, is operated jointly by Oscar E. Erickson, Inc. and Industrial Tank, Inc. The station allows larger quantities of materials to be accumulated and wastes to be trucked the remaining distance to the Class I sites in larger capacity trucks that are less costly to operate.

The California Department of Transportation has records of 100 spills involving hazardous materials in Bay Area counties from July 1973 to June 1976. Most of these spills occurred in Alameda or Contra Costa County. *At the present time, not all firemen know the correct procedures for handling spills and confusion may arise before the proper agency(s) are notified.*

o Disposal

Most hazardous wastes generated in the Bay Area are eventually disposed of on-site or at one of the three Class I sites in the region. The site operator is required to sign the manifest and send an additional copy to the State.

Some wastes are illegally disposed of to sewers in the region. Most of these problems may be due to the smaller producers being unaware that such disposal is illegal. Some also believe that these wastes may be illegally dumped by some of the smaller liquid waste haulers. One of the reasons for development of the manifest system described earlier was to allow the U.S. Department of Transportation and the State Department of Health to identify loads which never reach a hazardous waste site through checking manifest records. It is essential that adequate personnel be available to monitor and enforce the manifest system to minimize illegal disposal.

There are three Class I sites in the region. Two are in Contra Costa County, one near Richmond and a second near Martinez. A third site is near Benicia in Solano County.

Sierra Reclamation and Disposal, Inc., a subsidiary of Industrial Tank, Inc., owns a 150 acre site near Martinez in Contra Costa County. It is operated by Pacific Disposal Systems, Inc., another subsidiary of Industrial Tank, Inc. The management of the site believe that pretreatment is best accomplished at the disposal site since disposal is relatively simple should treatment fail.

A laboratory, an incinerator, a waste treatment equipment complex, caustic scrubbers, an oil reclamation unit, solar evaporation ponds, biodegradation areas, and landfill areas are at the site. It was estimated by both the State of California and the site operator that the remaining life of the site is more than 20 years.

Pacific Reclamation and Disposal, Inc., also a subsidiary of Industrial Tank, Inc., owns a 281 acre site near Benicia in Solano County. It is also operated by Pacific Disposal Systems, Inc. Acid neutralization, oil recovery, solar evaporation, sludge drying, and solid disposal occur at this site. It was estimated by both the State of California and the site operator that the remaining life of the site is more than 25 years.

The West Contra Costa County Landfill is a 350 acre Class II-2 and Class I site operated by the Richmond Sanitary Service. The site was temporarily closed in early 1977 due to a lack of freeboard on the pond since it had reached its capacity. The site has been re-opened on a limited basis. The pond for hazardous fluids has been converted into two sections, the first for solar evaporation and the second for storage of oil wastes that are skimmed off the first pond. Oily wastes are no longer allowed to accumulate in the first pond. The owners are currently looking for a market for this oil. Containerized materials are accepted for burial. The site operator estimated that the remaining life of the site is indefinite.

The State Department of Health regulates the disposal of hazardous materials. The Department is assembling a multidisciplinary staff. Statewide, twenty-five professionals, including chemical and sanitary engineers, geologists, chemists, biologists, industrial hygienists, and biochemists, visit landfills and plants, gather data, provide information, and enforce regulations, as well as conduct research and develop automated methods to handle the data received on waste handling practices. *Additional staff will be needed.*

o Resource Recovery

Technology is available to recover many hazardous materials. However, hazardous waste recovery equipment can be very expensive and highly specialized. Having wastes hauled to disposal sites can be more convenient and is often cheaper.

The three hazardous materials currently being reclaimed in any quantity are oil, solvent and acid.

Oil accumulated at the Class I sites in Benicia and Martinez is reclaimed by San Pablo Oil Company, Inc., a subsidiary of Industrial Tank. Much oil recovery also occurs before oil reaches these sites, however. The Economy Oil Company and the Fabian Oil Refined Company, both in Oakland, each pick up used oil from service stations in the north Bay Area, including eastern Marin, and the Santa Rosa, Petaluma, Napa and Vallejo areas. Both companies re-refine the used oil for use as road, motor or fuel oil. Other companies periodically collect used oil that is accumulated in service stations in the remainder of the Bay Area.

Romic Chemical Company in East Palo Alto operates the largest solvent reclamation and recovery business in the Bay Area. About 1.5 million gallons of solvent are reclaimed annually. Sierra Reclamation and Disposal also has solvent recovery equipment associated with its waste process unit that recovers about ½ million gallons of solvent annually. Solvent Services Co. in San Jose has a similar, though smaller, operation. Van, Water and Rogers of San Jose and Baron-Blakeslee of Newark are relatively new companies in this field. A few companies operate solvent recovery processes in their plants. For example, a tannery in Napa County reclaims the processing solvent for reuse. *In-plant recovery of solvents, in most*

instances, is difficult because of the cost of specialized equipment and the need to produce an effluent water that can be discharged to sewers. More solvents are potentially available for recovery and the existing firms could accommodate more customers. The main problem in getting more customers is convincing them that reusing solvent is less expensive than paying for disposal at a Class I disposal site plus paying for new solvent. The only change in existing practices that producers would need to make is to store different kinds of used solvents in separate drums. This housekeeping measure reduces the cost of reclamation and ensures that the solvents are of acceptable purity when reclaimed. Some of the companies that still dispose of their solvents find reclamation difficult due to the cost of specialized equipment for reclamation.

Zero Waste Systems, Inc. in Oakland, specializes in recycling of industrial wastes. The firm purchases, or removes at no charge, selected surplus or waste materials. Examples of such materials include lab chemicals, surplus chemicals, reactive metals, chlorinated solvents, and organic solvents. Waste collected by the firm will be stored or marketed for reuse.

The State Department of Health has begun to develop a much needed waste exchange system. It has found markets for a variety of materials, including heavy metals and acids, and advises industry on designing marketable by-products.

Other private consulting firms also provide advice.

b. AGRICULTURAL WASTES

o Waste generation and storage

Hazardous agricultural wastes consist of pesticide containers and the residual chemicals. Large numbers of pesticide containers are usually accumulated before eventual disposal. This practice is actively discouraged by the Agricultural Commissioner's office in each of the counties through an educational program on pesticide safety required by the State Department of Food and Agriculture.

o Transport

The accumulated containers are eventually trucked to a Class I site by the users themselves. At least one company that supplies pesticides provides collection and transport to a Class I site as a service to its customers.

o Disposal

The larger 30-gallon and 55-gallon pesticide drums are reused. Paper containers are either burned on site or taken to a Class I site. Burning is subject to air pollution and health regulations.

Most smaller 5-gallon containers are triple-rinsed on-site and then may be deposited at a Class II-I landfill.

Some agri-chemical containers are deposited at the Benicia site described earlier. Most pesticide containers, however, are hauled to the Big Blue Hills Disposal Site, a Class I site operated by the Fresno County Department of Public Works. The Central site in Sonoma County is classified as a Class II-I site and is able to accept specified agri-chemicals subject to approval of the local Regional Water Quality Control Board and the County Health Officer. No such disposal has occurred to date.

c. HOSPITAL WASTES

o Waste generation and storage

Some hazardous hospital wastes are rendered non-hazardous before they leave the hospital. Certain infectious and pathological wastes are sterilized and incinerated, respectively, while some disposable hypodermic syringes are crushed.

o Transport

Certain hospital wastes may be transported in sealed containers that are specially marked.

o Disposal

These specially-marked containers can go to non-Class I sites. *Other hospital wastes including some pathological and infectious wastes are disposed of within the general waste stream. Patient wastes and food wastes enter the sewer system.*

E. LANDFILL CAPACITY

According to the State Department of Health and site operators, the three existing Class I sites and facilities have estimated remaining lives:

- o Sierra Reclamation and Disposal, Inc., Martinez -- 20-plus years
- o Pacific Reclamation and Disposal, Inc., Benicia -- 25-plus years
- o West Contra Costa County Landfill, Richmond -- indefinite

However, existing disposal capacity is limited by the amount of liquid waste that can be evaporated annually from the solar evaporation ponds at these sites.

Present Class I site capacity may decrease because the West Contra Costa site may be closed. It was temporarily closed by the Regional Water Quality Control Board early in 1977 and is now reopened on a limited basis. In 1976, 15% of the region's hazardous wastes went to the Richmond site.

Uncertainty about the continued availability of the Richmond site, and data limitations discussed above do not permit determination at this time of how much, or when, additional landfill capacity will be needed. The extent and timing of resource recovery processing by industry will also affect capacity requirements.

Land areas suitable for receiving hazardous wastes are classified in ABAG critical areas policies as areas of critical environmental concern which should be preserved from urban development. It can be assumed that there will be a continuing need for land disposal of wastes for which recovery processes have not been developed. Using strict Federal, State, regional and local criteria for the location of Class I sites, the region should be screened to identify potential Class I site areas, so that one or more of these areas can be reserved when future need has been determined.

Detailed criteria for verifying the acceptability of potential Class I site areas are necessary to enable Bay Area Counties to select site(s) which should be protected from encroaching urban development.

SOLID WASTE MANAGEMENT PLAN ADVISORY COMMITTEE: July 28, 1977- 1:30 p.m.

SYNOPSIS

SUBJECT	COMMITTEE COMMENTS	STAFF RESPONSES
Draft Solid Waste Management Brief #3 Hazardous Waste Management in the Bay Area		
Problem Statement-Existing Handling Practices	Economic considerations, as well as housekeeping practices, lead to mixing of wastes.	The statement will be changed to include economic considerations as a factor.
Problem Statement-Resource Recovery	Technology is available to recover most hazardous materials. The equipment needed can be expensive, and having wastes hauled to disposal sites can be more convenient.	This statement will be changed to imply that these are not always the case.
	The statements under Resource Recovery should be re-ordered so that the third one regarding the need for a waste exchange system is first.	This section will be rearranged. Statements regarding public education and incentives for resource recovery will be added.
	The lack of incentives of recycling should be listed as a problem.	
	Recycled materials often are not competative with virgin materials. Part of this problem is the need for a public education program.	

SUBJECT	COMMITTEE COMMENTS	RESPONSES
Existing and Projected Hazardous Waste Characteristics and Production Rates.	Some questions were raised regarding the accuracy of the estimates.	These estimates have to be used until the county surveys are completed. At this time more accurate estimates are unavailable.
Existing Practices for Generation, Storage, Transportation, Disposal, and Processing of Wastes	The brief should note that some critics feel that the enforcement of existing transportation regulations is inadequate.	A comment to this effect will be added.

APPENDIX B

ASSESSMENT CHECKLIST

ASSESSMENT CHECKLIST

I. ENVIRONMENTAL CRITERIA

A. Air Quality

1. Federal standards for air quality
   - Total suspended particulates
   - Carbon monoxide
   - Photochemical oxidants
   - Hydrocarbons
   - Sulfur dioxide
   - Nitrogen dioxide

2. State standards for air quality
   - Lead
   - Sulfate
   - Hydrogen sulfide
   - Ethylene
   - Visibility reducing particulates

3. Other air quality considerations
   - Ozone depletion
   - Odor

B. Surface and Ground Water Quality and Quantity

1. Effect on beneficial uses
   - Municipal and domestic supply
   - Agricultural supply
   - Industrial process supply
   - Industrial service supply
   - Goundwater recharge

- Freshwater replenishment
- Navigation
- Hydropower generation
- Water contact recreation
- Non-contact water recreation
- Ocean commercial and sport fishing
- Warm freshwater habitat
- Cold freshwater habitat
- Preservation of areas of special biological significance
- Saline water habitat
- Wildlife habitat
- Preservation of rare and endangered species
- Marine habitat
- Fish migration
- Fish spawning
- Shellfish harvesting

2. Water quality objectives have been set forth in the Basin Plan (Water Quality Control Plan, San Francisco Bay Basin) to protect the beneficial uses of surface and ground waters. These objectives have been accepted by State and Federal agencies. The assessment process will involve the estimation of the effects of alternative environmental management strategies with respect to these water quality objectives and other policies.

3. The assessment process will also involve the estimation of mass emission rates of pollutants. These emissions will include:

   - Organic material
   - Nutrients
   - Sediments and other suspended solids
   - Disease causing organisms

- Floating material
- Heat
- Radioactivity
- Heavy metals and other toxicants
- Chemical constituants

4. Effect on surface and ground water quantity

   - Impact on surface water supplies and requirements for water importation
   - Impact on groundwater table
     - Changes in safe yield
     - Subsidence

C. Physical Resources

1. Effect on flora and fauna

   - Impacts on desirable, unusual, rare, or endangered species
   - Impact on plant species which provide cover and food for important wildlife species
   - Effects upon noxious species of plants or animals

2. Effect on the supply of critical land-related resources

   - Impact on prime or unique agricultural lands
   - Impact on other agricultural lands
   - Impact on mines, quarries, and mineral-bearing lands.
   - Impact on timber-producing and other forested lands
   - Impact on salt ponds
   - Impact on geothermal sites
   - Impact on wet lands, marshes, coastal zones, and estuaries
   - Impact on wildlife habitat
   - Impact on hilly land, fragile land, or land subject to erosion

3. Effect on land sites with special development characteristics

- Effects upon lands uniquely suited for seaport, airport, marina, or energy site development

4. Effect on recreation use or potential

- Impact on actual or potential recreation sites (e.g., parks, beaches, stadia, etc.)
- Impact on recreation use

5. Effect on solid waste

- Impact on solid waste volume
- Impact on resource recovery
- Impact on hazardous materials

D. Energy

1. Effect on energy consumption/demand

- Impact on natural gas consumption
- Impact on electricity consumption
- Impact on petroleum consumption
- Impact on coal or other non-renewable energy resource consumption

2. Effect on energy conservation/supply

- Impact on efficiency in the use of energy
- Impact on energy use
  - Peak energy use
  - Off-peak energy use
- Impact on resource recovery and recycling
- Impact on energy production as a by-product of residuals management
- Impact on solar energy production

E. Amenities

1. Effect on visual amenities

- Preservation of scenic areas, the natural state of the environment, and open space.
- Height and bulk of structures required for or affected by the plan
- Visibility impact of clean air
- Appearance of urban landscape

2. Effect on historic and cultural resources

- Impact on historic landmarks, monuments, districts, archaeological sites, and other areas of historic or cultural significance
- Impact on sites with special water-related historical significance

3. Effect on noise

- Impact and location of transportation noise
- Impact and location of construction noise
- Special noise problems due to pollution reduction activity (e.g., trash collection, street sweeping)

4. Effect on odor

- Impact on type, strength, location and duration of odors

II. INSTITUTIONAL AND FINANCIAL CRITERIA

A. Financial

1. Direct costs of implementation

- Capital and replacement costs
- Operating/maintenance costs
- Administrative costs
- Costs of regulation, inspection, and enforcement

2. Fiscal effects on local government (assuming constant levels of State or Federal assistance)

   - Impact on general obligations, revenue or special assessment bonds and bonding capacity
   - Impact on property tax base
   - Impact on property tax rate
   - Impact on sales and other taxes
   - Impact on fees, licenses, and other user charges
   - Impact on connection and stand-by charges
   - Imapct on Federal and State grant subvention funding dependence and eligibility
   - Impact on interest earnings and cash revenues

B. Institutional

1. Impact on the provision of public services

   - Type, level, and displacement of public service (e.g., police, fire, sewerage, etc.)

2. Effect on public agencies

   - Impact on intergovernmental responsibility and coordination

3. Implementability

   - Public acceptability
   - Organizational and political feasibility
   - Legal capability
   - Impact on existing plans, regulations, and policies
   - Complexity or simplicity of control measures and their implementation

4. Flexibility

   - Reversability of decision

III. ECONOMIC CRITERIA

A. Production of goods and services

1. Effect on industrial, commercial, agricultural, and service activity by categories (e.g., manufacturing, construction, transportation, etc.)

2. Effect on employment, unemployment, and underemployment

- Impact on job creation and elimination by categories (e.g., professional, technical, crafts, etc.)

B. Income and investment

1. Effect on wages and salaries

2. Effect on rents

3. Effect on capital investment for new and replacement facilities or equipment

4. Effect on profits

C. Consumer expenditures

1. Effect on the prices of goods and services

2. Effect on consumption of goods and services

IV. SOCIAL CRITERIA

A. Housing Supply

1. Effect on existing housing stock

- Impact on the removal of housing by demolition or conversion
- Impact on housing quality
- Impact on the cost of housing and rent
- Impact on the cost of housing rehabilitation & maintenance

2. Effect on new housing stock

- Impact on the cost of new housing
  - Cost of land
  - Cost of site preparation
  - Cost of construction
- Impact on supply of new housing
  - Quantity of new units produced
  - Proximity to employment opportunities

B. Physical Mobility

1. Impact on public transportation

- Cost
- Time
- Convenience
- Purpose of trip

2. Impact on private transportation

- Cost
- Time
- Convenience
- Purpose of trip

C. Health and Safety

1. Effect on site hazards

- Impact on seismic safety and risk
- Impact on flood plain safety and flood risk

2. Effect on transportation conflicts

3. Effect on public health

D. Sense of Community

1. Effect on community character
2. Effect on community stability

E. Equity

1. Impact on individual opportunity and lifestyle
2. Impact on special population groups
   - Aged
   - Youth
   - Ethnic Minorities
   - Women
   - Low-income
   - Handicapped people
   - Individuals with special employment problems

F. Urban Patterns

1. Location of development
2. Density of development
3. Type of development
4. Timing of development

APPENDIX C

ACCEPTABILITY TABLES

ALAMEDA COUNTY

CODE	SIZE (* cells)	LOCATION	PRESENT USE(S)*	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
A	10	Oakland/ Piedmont Hills	Urban (10)	Urban	Highway 13	Franciscan Assemblage	Drainage through urbanized Oakland to Bay		Unacceptable
B	17	Oakland Hills	Urban (12) Dev. Pot. (3) Undev. (2)	Urban and park	Highway 13	Mixture of serpentine, Tl and Creta/ Jurassic sandstones and shales	Drainage through San Leandro to Bay		Unacceptable
C	42	Hayward/Castro Valley	Urban (30) Dev. Pot. (7) Undev. (5)	Urban and park	Highways 580 & 238; poor for undev. areas	Mixture similar to "B" above; undev. is undifferentiated Cretaceous sandstone and shale	Drainage through Castro Valley to Bay		Unacceptable
D	7	Fremont Hills	Urban (7)	Urban	Highway 238	Tertiary and Jurassic sandstone and shale	Drainage through Newark to Bay		Unacceptable
E	2	Coyote Hills	Quarry and park (2)	Park, urban and salt ponds	Highway 84	Mixed Franciscan Assemblage	Drains to salt ponds and Bay		Unacceptable

* Number of cells in each category are in parentheses.

ALAMEDA COUNTY (cont.)

CODE	SIZE (= cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
F	18	Vicinity of Sunol	Undev. (18)	Undev. grazing and urban	Highways 238 and 680	Tertiary sandstones and shales	Near San Antonio Res. and So. Bay Aqueduct	Scattered sites only	Unaccepted
G	3	Dublin Area	Undev. (3)	Undev. grazing	Highways 580 and 680	Tertiary sandstones and shales	Drainage into San Ramon Ck.	Scattered low density residential development; probably politically unacceptable	Unacceptable
H	30	North Livermore Hills	Urban (8) Dev. Pot. (2) Undev. (20)	Undev. grazing and urban	Highway 580	Unconsolidated young Tertiary sedimentary materials	Cayebana and Arroyo Creeks	Air pollution problems	Probably unacceptable even for undev. cells
I	62	East Livermore Hills	Dev. Pot. (5) Undev. (57)	Undev. grazing and urban	Highway 580; poor to outlying areas	Mixture of Tertiary sandstones and shales with Franciscan Assemblage	Cayebana and Arroyo Creeks	Near Livermore Rad. Lab.; air pollution problems	Probably unacceptable even for undev. cells
J	24	Altamont Pass Area	Undev. (24)	Undev. grazing	Highway 580; poor in outlying areas	Mixture of Tertiary and Cretaceous sandstone and shale		Vicinity of future Class II site	Possibly acceptable for all but four remote cells

ALAMEDA COUNTY (Cont.)

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
K	80	Central Valley Foothills	Undev. (80)	Undev. grazing and row crops	Highways 5 and 580; poor in outlying areas	Mixture of Tertiary and Cretaceous sandstone and shale	3 cells at south end adjacent to creek		Possibly acceptable for all but seven remote cells and 3 cells at the south end
Summary	295		Park and Urban (69) Dev. Pot. (17) Undev. (209)						Unacceptable (128) Probably unacceptable (77) Possibly acceptable (90)

CONTRA COSTA COUNTY

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
A	54	El Cerrito/San Pablo Hills	Urban (53) Undev. (1)	Urban and undev. grazing	Highway 80	Largely Tertiary sandstone and shale	Drainage through San Pablo and Richmond to Bay	Existing Class I site in this area	Unacceptable
B	61	Pinole/El Sobrante Hills	Urban (34) Dev. Pot. (27)	Urban and undeveloped	Highway 80	Tertiary sandstone and shale	Drainage through Rodeo to Bay	-	Unacceptable
C	14	Hills southwest of Martinez	Undev. (14)	Undev. grazing	Highways 80 and 4; Pinole Valley and Alhambra Valley Roads through residential areas	Tertiary and Cretaceous sandstone and shale	Drainage to Carquinez Straits and San Pablo and Briones Reservoirs	Cells are moderately scattered	Probably unacceptable
D	91	Central County Hills	Urban (67) Dev. Pot. (1) Undev. (23)	Urban and undev. grazing	Highways 24 and 680; St. Mary's Road and Moraga Way through residential areas	Largely Tertiary sandstone and shale	Drainage to Upper San Leandro Reservoir and Las Trampas and Walnut Cks.	-	Probably unacceptable for undev. cells
E	49	Martinez Hills	Urban (20) Dev. Pot. (29)	Urban and undeveloped grazing	Highways 4 and 680	Tertiary and Cretaceous sandstone and shale	Drainage through Martinez to Carquinez Straits	Existing Class I site in this area; air pollution problems	Unacceptable

CONTRA COSTA (cont.)

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
F	15	Lime Ridge/ Concord Hills	Undev. (15)	Urban, undev. and open space	Highway 680; Ygnacio Valley Road through residential areas	Tertiary and Cretaceous sandsone and shale	Drainage through Walnut Ck. and Concord to Carquinez Straits	Probably not politically acceptable 1 cell is scattered	Probably unacceptable for all but 1 scattered cell that is unacceptable
G	77	East of San Ramon Valley	Undev. (77)	Urban and undev. grazing	Highway 680; poor to outlying areas	Tertiary and Cretaceous sandstone and shale; much is unconsolidated	Drainage to San Ramon Ck.	-	Probably unacceptable for all but 5 scattered cells that are unacceptable
H	45	Hills East of Concord and Clayton	Urban (9) Undev. (36) (including U.S. Naval Magazine)	Urban and undev.; park U.S. Naval Magazine	Highways 24 and 4; Clayton and Marsh Creek Roads; poor to outlying areas	Tertiary and Cretaceous sandstone and shale	Drainage to Marsh Creek or to Mt. Diablo Ck. and Suisun Marsh	-	Probably unacceptable for undev. cells
I	3	Hills South of Pittsburg	Dev. Pot. (1) Undev. (2) grazing	Urban and undev.	Highway 4; Buchanan and Kirker Pass Roads	Tertiary and Cretaceous sandstone and shale	Drainage through Pittsburg; Kirker Ck. to Delta	Scattered	Unacceptable
J	56	North Central Valley Foothills	Urban (1) Dev. Pot.(28) Undev. (27)	Urban and undev. grazing and row crops	Highways 4 and 160	Tertiary sandstone and shale	Contra Costa Costa, Sand and Marsh Creeks to Suisun Marsh	-	Probably unacceptable for undev. cells

CONTRA COSTA (cont.)

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
K	127	South Central Valley Foothills	Undev. (127)	Undev. grazing and row crops	Highway 4 and Byron Highway; poor to outlying areas	Cretaceous and Tertiary sandstone and shale	Marsh and Kellogg Creeks to San Joaquin River	-	Possibly acceptable
L	16	North of Altamont Pass	Undev. (16)	Undev. grazing	Highway 4 and Vasco Road; poor to outlying areas	Largely Cretaceous sandstone and shale	Kellogg Creek to San Joaquin River		Possibly acceptable
M	5	West Hills: Ala./C. Costa Counties	Undev. (5)	Undev. grazing and parks	Bolinger Canyon Rd.; very poor in outlying areas	Largely Tertiary sandstone and shale	Bolinger Creek	Scattered cells	Unacceptable
Summary	613		Urban (184) Dev. Pot.(86) Undev. (343)						Unacceptable (284) Probably unacceptable (186) Possibly acceptable (143)

MARIN COUNTY

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
A	77	East of Tomales	Undev. (77)	Undev. grazing	Highway 1; very poor for trucks	39 cells of sheared Franciscan Assemblage and 38 cells of poorly consolidated Tertiary sandstone and clay shale in north	Keyes and San Antonio Creeks to Tomales Bay;	Probably politically unacceptable	39 cells of unconsolidated rock are probably unacceptable
B	41	Miller Park and Marshall Hills	Undev. (41)	Undev. grazing; Tomales Bay; national seashore	Highway 1; very poor for trucks	Largely sheared sandstone and shale of the Franciscan Assemblage; 3 cells of sandstone and shale of the Franciscan Assemblage in north	Keyes and Walker Cks. to Tomales Bay; 5 cells are adjacent to Tomales Bay	Probably politically unacceptable	3 cells of unsheared rock in north are probably unacceptable
C	6	Central Marin Hills	Undev. (6)	Undev. grazing	Very poor	Sheared sandstone and shale of the Franciscan Assemblage	Nicassio and Arroyo Creeks to Nicassio Reservoir	Probably politically unacceptable; 3 cells are scattered	Unacceptable

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
D	165	Point Reyes	Undev. (5) National seashore(160)	Undev.; national seashore; Tomales Bay	Highway 1; very poor	Unconsolidated Tertiary sandstone and clay-shale in undev. area	Drainage to Drakes Bay, Tomales Bay, and ocean	Probably politically unacceptable even for undev. cells	Probably unacceptable for 5 undev. cells
E	53	Novato Hills	Urban (21) Dev. Pot (17) Undev. (15)	Urban and undev. grazing	Highway 101	Sheared Franciscan Assemblage with some Tertiary and Cretaceous sandstone and shale	Drainage through Novato to Bay; 8 undev.cells are adjacent to the Bay or a reservoir	Probably politically unacceptable; one scattered undev. cell	Unacceptable
F	24	Southern Marin	Urban (12) Dev. Pot. (8) Undev. (4)	Urban and undev. grazing	Highways 1 and 101	Franciscan Assemblage	Drainage to Bay or Ocean	Undev.cells are scattered	Unacceptable
Summary	366		Park or Urban (193) Dev. Pot.(25) Undev. (148)						Unacceptable (319) Probably unacceptable (47) Possibly acceptable (0)

NAPA COUNTY

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
A	227	Lake Berryessa Area	Undev. (221)	Undev. grazing and recreation	Highways 121 and 128;very poor for trucks	Franciscan Assemblage and Cretaceous/Jurassic sandstone and shale; some Tertiary volcanics	Drainage to lake; (18) adjacent to lake	-	Unacceptable
B	118	Yountville/Lake Hennessy Area	Undev. (118)	Undev. grazing and vineyards	Highway 29; poor to outlying areas	Franciscan Assemblage and Cretaceous/Jurassic and Tertiary sandstone and shale; some Ter. volcanics	Drainage to three reservoirs and then to Napa River	Probably politically unacceptable	Unacceptable
C	161	Hills Northeast of Napa	Dev. Pot (38) Undev. (123)	Undev. grazing and vineyards	Highways 12 and 29; poor to outlying areas	Tertiary Sonoma volcanics	Drainage to Napa River	Probably politically unacceptable	Unacceptable
D	61	Carneros Creek Area	Urban (4) Dev. Pot.(34) Undev. (23)	Undev. grazing	Highways 12, 29, and 121	Largely Tertiary & Cretaceous sandstone and shale and Tertiary volcanics	Drainage to Carneros Creek and the Napa River	-	Possibly acceptable for undev. cells
E	68	Hills in Southeast Corner of County	Undev. (68)	Undev. grazing	Highways 12 and 29	Tertiary and Cretaceous sandstone and shale	Drainage to both Napa River and Suisun Marsh	-	Possibly acceptable

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
F	16	Lake Curry Area	Undev. (16)	Undev. grazing	Highways 21 and 121; poor to outlying areas	Largely Cretaceous/ Jurassic sandstone and shale	Lake Curry; 1 cell adjacent to lake	-	Probably unacceptable except for 1 cell adjacent to Lake Curry that is unacceptable
Summary	651		Urban (4) Dev.Pot (72) Undev. (575)						Unaccentable (545) Probably unaccentable (15) Possibly acceptable (91)
SAN FRANCISCO COUNTY									
A	20	City of San Francisco	Urban (20)	Urban	Highways 1, 101 and 80	Franciscan Assemblage	Both Bay and ocean	-	Unacceptable
Summary	20		Urban (20)						Unacceptable (20) Probably unacceptable (0) Possibly acceptable (0)

SAN MATEO COUNTY

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
A	14	San Bruno Mt. Area	Urban (14)	Urban and undev. grazing	Highways 82 and 101	Cretaceous/ Jurassic sandstone with some Franciscan Assemblage	Drainage through South San Francisco to Bay	-	Unacceptable
B	28	North San Mateo Coast Hills	Urban (9) Dev. Pot.(12) Undev. (7)	Urban and undev. grazing	Highway 1; poor for trucks	Tertiary siltstone, mudstone, sandstone and conglomerate	Ocean	2 cells (undev.)are scattered; 5 cells (undev.)are together at south end	5 undev. cells at south end are probably unacceptable
C	64	Pennisula Hills	Urban (52) Dev. Pot.(9) Undev. (3)	Undev. grazing and urban	Highway 280	Largely Tertiary sandstone	Near Crystal Springs Reservoir not adjacent	-	3 cells undev. near south end of Res. are probably unacceptable
D	9	Central San Mateo County	Undev. (9)	Undev. grazing	Highway 84; very poor for trucks	Largely Tertiary sandstone and siltstone	Bogess Ck. to San Gregorio Ck.; those cells that aren't scattered are along Bogess Ck.		Unacceptable

SAN MATEO COUNTY (cont.)

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
E	20	Pescadero Point Area	Undev. (20)	Undev. grazing	Highway 1; very poor for trucks	Largely Tertiary siltstone and Cretaceous sandstone and conglomerate	Ocean; Lake Lucerne; 10 cells adjacent to water	5 cells not adj. to water are scattered	5 cells east of Pescadero Pt. are probably unacceptable
Summary	135		Urban (75) Dev. Pot. (21) Undev. (39)						Unacceptable (122) Probably unacceptable (13) Possibly acceptable (0)

SONOMA COUNTY

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
A	631	Penngrove Area	Urban (24) Dev.Pot.(141) Undev. (466)	Undev. grazing	Highways 101 116 and local roads to most undev. areas; poor for outlying areas	446 cells are poorly consolitated Tertiary sandstone, siltstone and clay-shale; 95 are sheared sandstone and shale of the Franciscan Assemblage; 62 are Sonoma volcanics on the east side of valley; 7 are Cretaceous sandstone and shale	Petaluma Creek	2 undev. cells are scattered	7 cells of Cretaceous sandstone and shale are possibly acceptable 366 cells of unconsolidated or volcanic Tertiary materials that are undev. and not scattered and undev. are probably unacceptable
B	68	Tolay Creek Area	Undev. (68)	Undev. grazing	Highways 101, 37 and 121	40 cells are poorly consolidated claystone, siltstone and sandstone; 10 cells are sandstone and shale of the Franciscan Assemblage; 18 cells are Sonoma volcanics	Pelaluma Creek		Probably unacceptable

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
C	30	Hills East of Sonoma	Urban (10) Dev. Pot.(19) Undev. (1)	Urban and undev. grazing	Highways 101, 37, 121, and 12; local roads	Largeley Sonoma volcanics	Various minor creeks and Sonoma Creek		Unacceptable
Summary	729		Urban (34) Dev. Pot.(160) Undev. (535)						Unacceptable (288) Probably unacceptable (434) Possibly acceptable (7)

SANTA CLARA COUNTY

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
A	9	Milpitas Hills	Dev. Pot.(4) Undev. (5)	Undev. grazing and urban	Highway 680; very poor to undev. areas	Those cells not scattered or with dev. pot. are on sheared Franciscan material	Drainage to Calaveras Reservoir for undev. cells; no adjacent cells	-	Unacceptable
B	25	Los Altos Hills Area	Urban (15) Dev. Pot. (8) Undev. (2)	Urban	Highway 280	Largely Franciscan greenstone or Tertiary sandstone and shale	Drainage through Los Altos and Mt.View to Bay	-	Unacceptable
C	10	Scattered San Jose Area	Urban (4) Dev. Pot.(4) Undev. (2)	Urban	Highways 280, 82, 85 and 9	Largely Tertiary and Cretaceous sandstone and shale with some Franciscan Assemblage	Drainage through Los Gatos, Santa Clara and San Jose to Bay	Air pollution problems	Unacceptable
D	23	Silver Creek Area	Urban (7) Dev. Pot.(16)	Urban	Highway 101 and residential streets	Largely sheared Franciscan Assemblage,serpentine, and Cretaceous conglomerate	Drainage through San Jose to Bay		Unacceptable

SANTA CLARA COUNTY (cont.)

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
E	27	New Almaden Area	Dev. Pot.(22) Undev. (5)	Urban and undev. grazing	Highway 101	Largely Franciscan Assemblage; 3 adjacent undev. cells are Franciscan sandstone with some shale	Calero and New Almaden Reserviors; 4 cells are adjacent to Calero Reservior	2 undev. cells are scattered	3 undev. cells east of Coyote are probably unacceptable
F	94	Mt. Hamilton Area	Dev. Pot.(7) Undev. (87)	Undev. grazing; some urban	Undev.cells are inaccessible	Undev. cells are largely highly sheared shale of the Franciscan Assemblage	Remote	-	Unacceptable
G	56	Uvas Reservoir Area	Dev. Pot.(46) Undev. (10)	Urban and undev. grazing	Highways 101 and 152;very poor for trucks	Largely Franciscan Assemblage	Undev.cells that aren't scattered are adjacent to either Uvas or Chesbro Reservior	-	Unacceptable
H	22	Southeast County Hills	Dev. Pot.(1) Undev. (21)	Largely undev grazing; some urban	Highway 101 to 129; poor to outlying areas	Largely Franciscan sandstone and greenstone, and Tertiary sandstone and gravel	Pescadero and Tar Creeks	-	11 cells in center of area are probably unacceptable

SANTA CLARA COUNTY (cont.)

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
I	44	Southwest County Hills	Dev. Pot.(3) Undev. (41)	Undev.grazing and orchards	Highways 101 and 152;poor to outlying areas	Eastern area is largely highly sheared shale of the Franciscan Assemblage; western area is largely Cretaceous sandstone and shale	Most cells in western area are adjacent to Coyote Creek	Cells other than on creek are scattered or inaccessible	Unacceptable
Summary	310		Urban (26) Dev. Pot.(111) Undev. (173)						Unacceptable (296) Probably unacceptable (14) Possibly acceptable (0)

SOLANO COUNTY

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
A	102	Hills Northwest of Allendale	Undev. (102)	Undeveloped grazing; some urban and orchards	Highways 5 and 128; Pleasant Valley Road; poor to outlying areas	Largely unconsolidated young Tertiary sand, silt and gravel in northeast largely Tertiary sandstone with some shale in east	Most sandstone and shale is adjacent to Pleasants Creek	Probably politically unacceptable	Unacceptable
B	86	Vacaville/ Allendale Hills	Urban (12) Dev. Pot. (74)	Urban and undev. grazing and orchards	Highways 80 and 505	Some unconsolidated young Tertiary sand, silt, and gravel; some Tertiary sandstone	Drainage through Vacaville; Alamo Ck.	-	Unacceptable
C	36	Hills South of Vacaville	Undev. (36)	Undev. grazing and row crops	Highway 80	Cells in east are largely Tertiary sandstone; those cells in west are largly Cretaceous sandstone	Alamo Ck.	-	Possibly acceptable
D	40	Lake Frey Area	Urban (1) Dev. Pot. (5) Undev. (34)	Undev. grazing with some urban	Highway 80 and Wooden Valley Road	Tertiary Sonoma Volcanics	Wooden Valley Creek and Lake Frey	-	Probably unacceptable for undev. cells

SOLANO COUNTY (cont.)

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
E	23	Hills Northwest of Fairfield	Urban (1) Dev. Pot.(2) Undev. (20)	Undev. grazing with some urban	Highway 80 and local roads	Cretaceous sandstones and shales	Ledgewood and Laurel Creeks	-	Possibly acceptable for undev. cells
F	13	Vacaville/ Travis Hills	Undev. (13)	Undev. grazing and row crops	Highway 80 and local roads	Young, unconsolidated sand, silt, and gravel	Alamo Creek	-	Probably unacceptable
G	26	Travis Area	Urban (18) Dev. Pot.(5) Undev. (3)	Urban	Highways 80 and 12;local roads	Tertiary sandstone and shale, and unconsolidated sand, silt, and gravel	Union Ck.	-	Unacceptable
H	43	Deverton Area	Undev. (43)	Undev. grazing and marsh	Highways 80 and 12	33 cells are unconsolidated Tertiary sand, silt, and gravel; 10 cells are Tertiary sandstone and shale	Suisun Marsh is adjacent to 5 cells of Tertiary sandstone	Wildlife area	5 cells of Tertiary sandstone not next to Marsh are possibly acceptable; the remainder are probably unacceptable
I	24	Montezuma Hills	Undev. (24)	Undev. grazing and marsh	Highways 80 and 12 with local roads	5 cells are unconsolidated Tertiary sand, silt, and gravel; remainder are Tertiary sandstone and shale	Suisun Marsh	Wildlife area	5 cells of young materials are probably unacceptable; the remainder are possibly acceptable

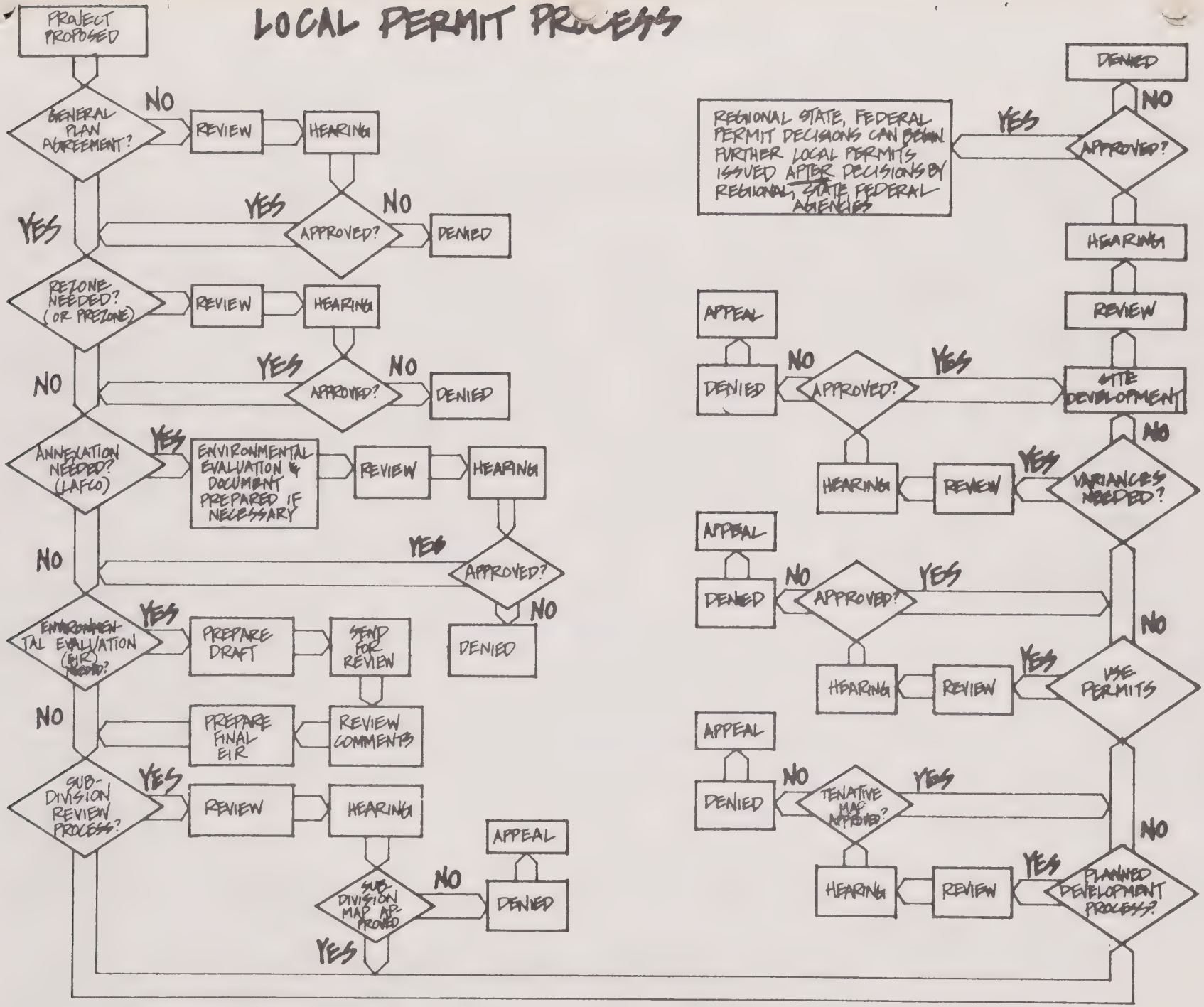
SOLANO COUNTY (cont.)

CODE	SIZE (# cells)	LOCATION	PRESENT USE	ADJACENT USE(S)	TRANSPORTATION ACCESS	GEOLOGIC MATERIALS	NEAREST SURFACE WATER	OTHER ISSUES	OVERALL AREA ACCEPTABILITY
J	32	Suisun/Devertor Hills	Undev. (32)	Undev. grazing and marsh	Highways 80 and 12	Largely Tertiary sandstone and shale	Suisun Marsh is adjacent to 3 cells	Wildlife area	5 cells next to Suisun Marsh are probably unacceptable; remainder are possibly acceptable
K	15	Hills Southwest of Cordelia	Dev. Pot.(1) Undev. (14)	Undev. grazing	Highways 80 and 21	Largely Tertiary and Cretaceous mudstone,sandstone, and shale	Sulphur Creek	2 cells are scattered	2 undev. cells on east side are unacceptable;remainder of undev.cells are possibly acceptable
L	135	Benecia/Vellejo Hills	Undev. (135)	Undev. grazing; 34 cells adjacent to urbanized areas	Highways 80 and 680 and Lake Herman Road	Largely Cretaceous mudstone and shale	Sulphur Creek	Existing Class I site in this area; 2 cells are scattered	Possibly acceptable except for 36 cells by urban areas or scattered
Summary	575		Urban (32) Dev. Pot.(87) Undev.(456)						Unacceptable (262) Probably unacceptable (95) Possibly acceptable (218)

APPENDIX D

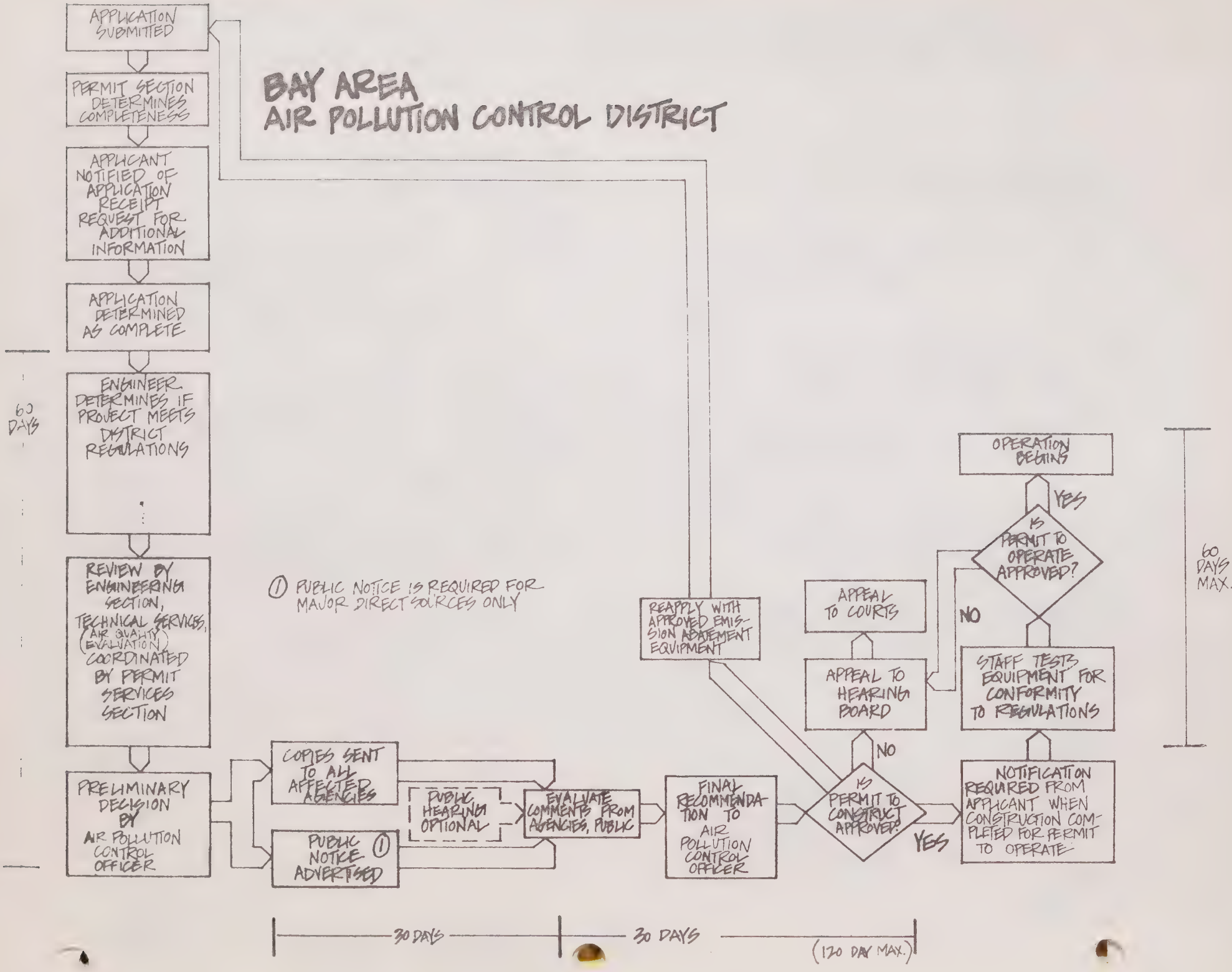
EXCERPTS FROM THE ABAG BAY AREA PERMIT DIRECTORY OF INDUSTRIAL DEVELOPMENT WITH ADDITIONAL INFORMATION ON THE PERMIT PROCESSES OF THE STATE SOLID WASTE MANAGEMENT BOARD AND THE STATE DEPARTMENT OF HEALTH

LOCAL PERMIT PROCESS

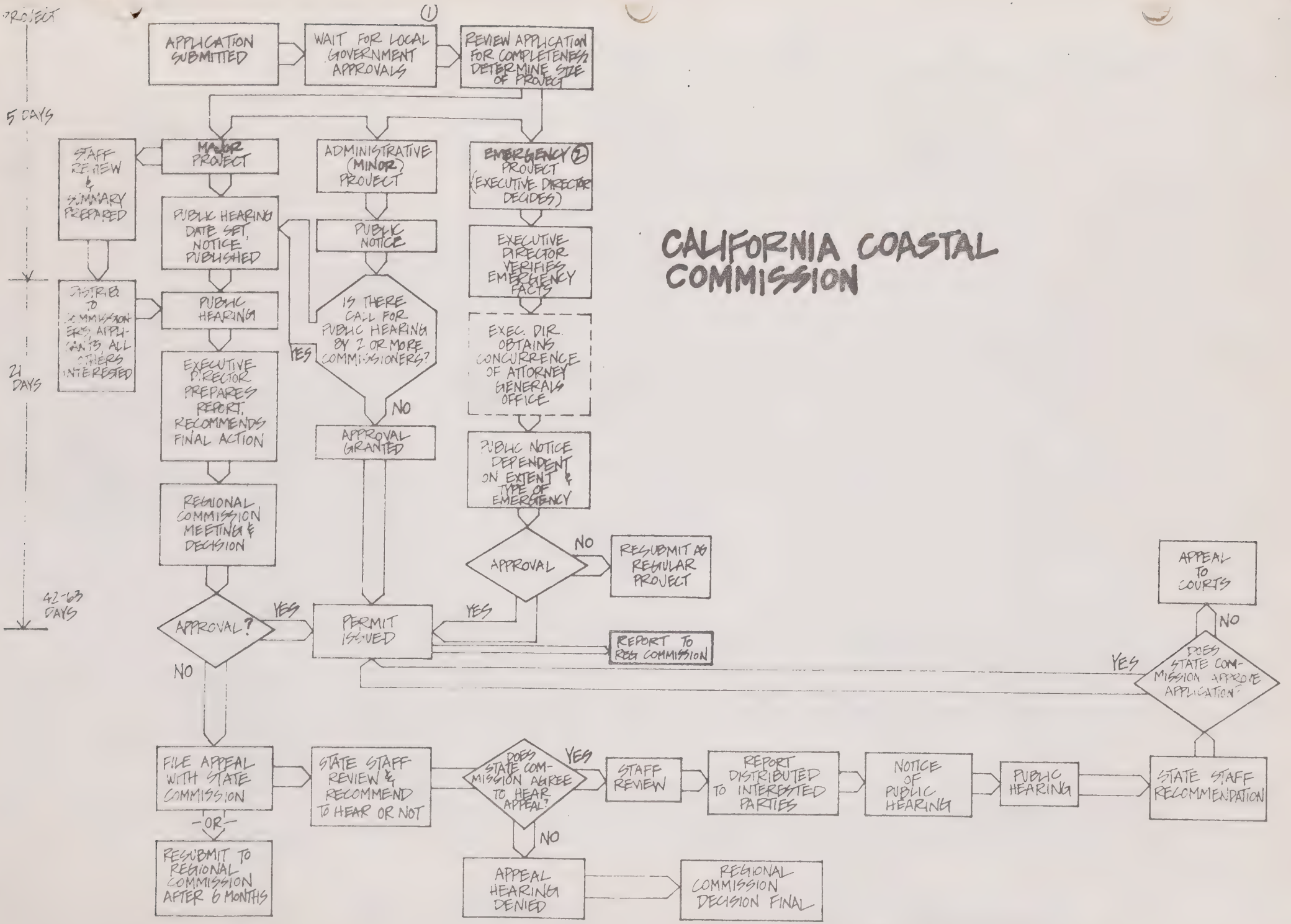


EVERY PROJECT MAY NOT HAVE TO GO THROUGH EACH OF THESE STEPS. AN ENVIRONMENTAL REVIEW WOULD BE REQUIRED AT THE VERY FIRST STEP IN ANY LOCAL APPROVAL PROCESS. THESE ACTIONS DO NOT NECESSARILY HAPPEN SEQUENTIALLY. ANNEXATION, & GENERAL PLAN AMENDMENTS COULD BE PROCESSED SIMULTANEOUSLY AS COULD SUBDIVISION REVIEW, PLANNED DEVELOPMENT AND USE PERMITS.

BAY AREA AIR POLLUTION CONTROL DISTRICT

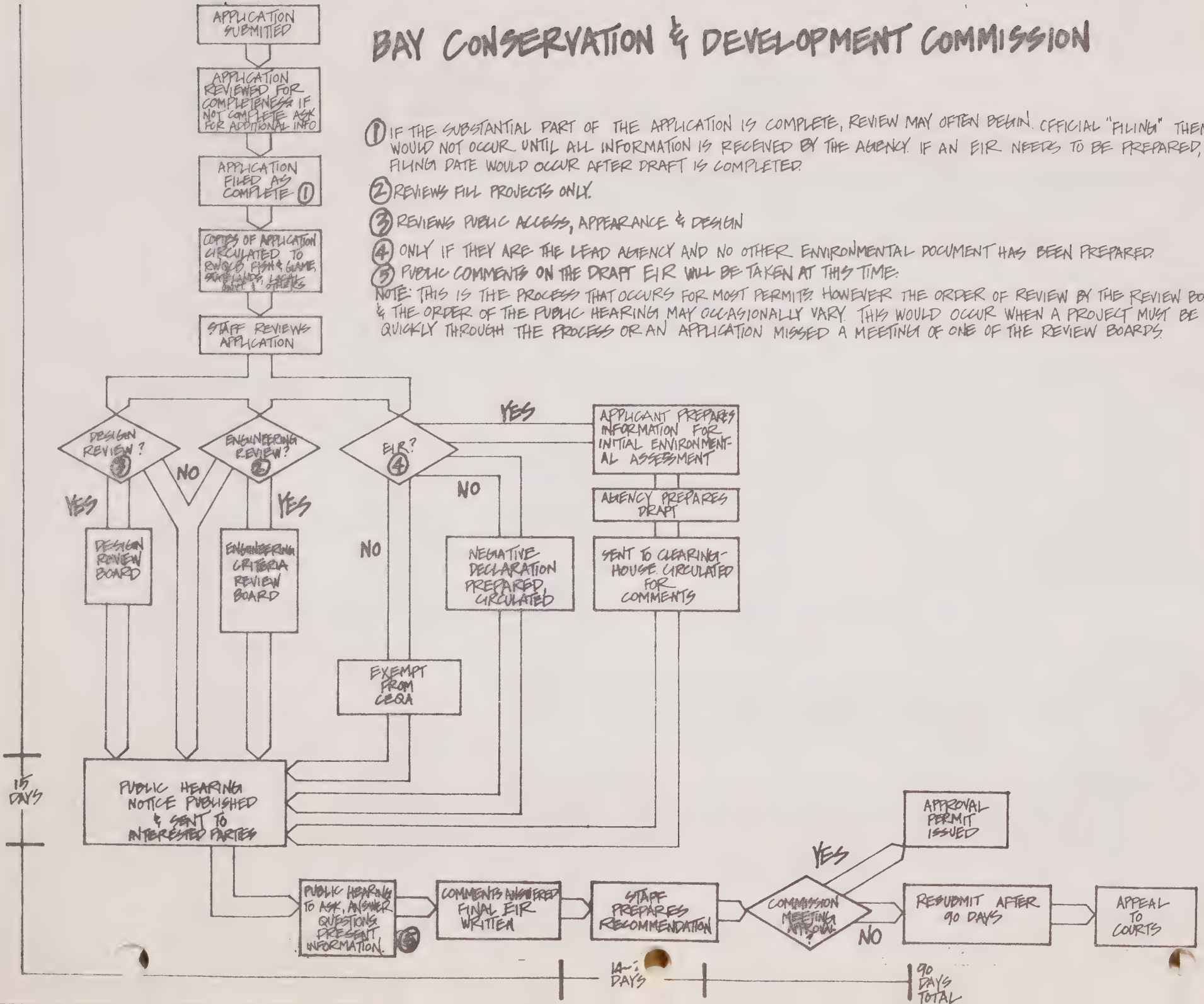


CALIFORNIA COASTAL COMMISSION



NOTES: (1) PERMIT PROCESSING USUALLY MOVES AHEAD ALTHOUGH DECISIONS ARE NOT MADE UNTIL LOCAL APPROVALS ARE GIVEN.
(2) NO APPEALS TO REGIONAL OR STATE COMMISSIONER FROM EXECTIVE DIRECTOR DECISION

BAY CONSERVATION & DEVELOPMENT COMMISSION



(1) IF THE SUBSTANTIAL PART OF THE APPLICATION IS COMPLETE, REVIEW MAY OFTEN BEGIN. OFFICIAL "FILING" THEN WOULD NOT OCCUR UNTIL ALL INFORMATION IS RECEIVED BY THE AGENCY. IF AN EIR NEEDS TO BE PREPARED, FILING DATE WOULD OCCUR AFTER DRAFT IS COMPLETED.

(2) REVIEWS FILL PROJECTS ONLY.

(3) REVIEWS PUBLIC ACCESS, APPEARANCE & DESIGN

(4) ONLY IF THEY ARE THE LEAD AGENCY AND NO OTHER ENVIRONMENTAL DOCUMENT HAS BEEN PREPARED.

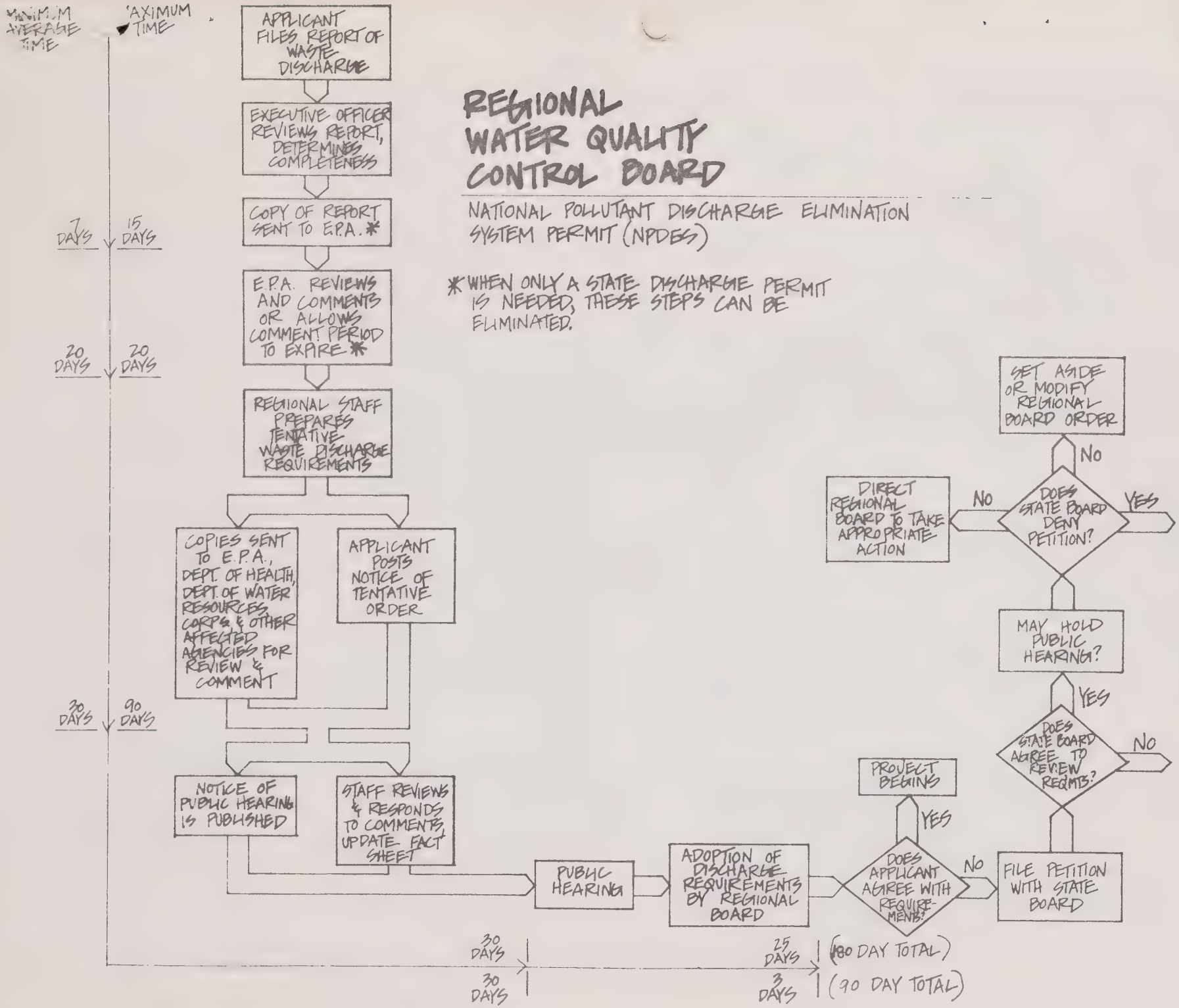
(5) PUBLIC COMMENTS ON THE DRAFT EIR WILL BE TAKEN AT THIS TIME.

NOTE: THIS IS THE PROCESS THAT OCCURS FOR MOST PERMITS. HOWEVER THE ORDER OF REVIEW BY THE REVIEW BOARDS & THE ORDER OF THE PUBLIC HEARINGS MAY OCCASIONALLY VARY. THIS WOULD OCCUR WHEN A PROJECT MUST BE MOVED QUICKLY THROUGH THE PROCESS OR AN APPLICATION MISSED A MEETING OF ONE OF THE REVIEW BOARDS.

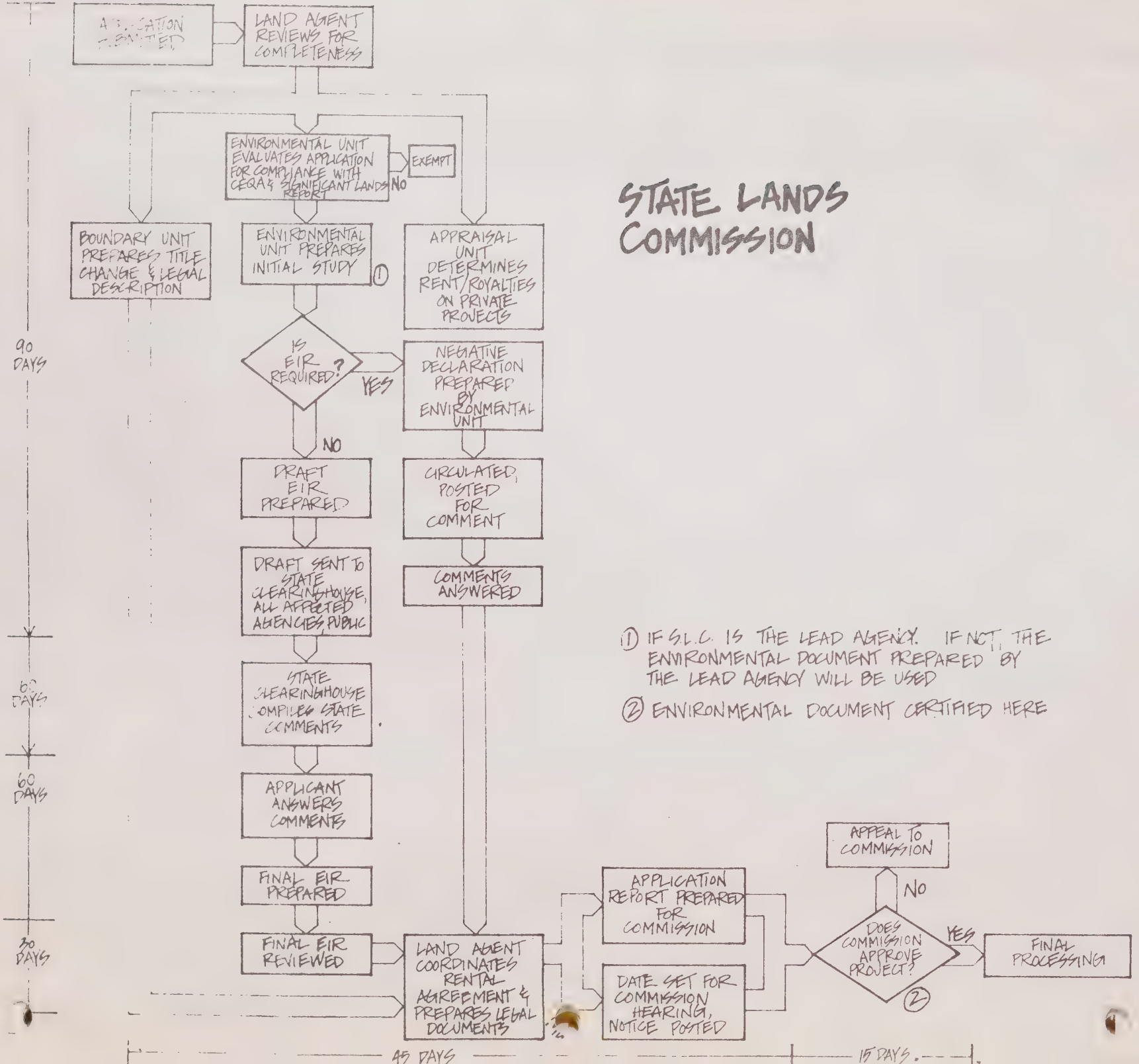
REGIONAL WATER QUALITY CONTROL BOARD

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT (NPDES)

*WHEN ONLY A STATE DISCHARGE PERMIT IS NEEDED, THESE STEPS CAN BE ELIMINATED.



STATE LANDS COMMISSION

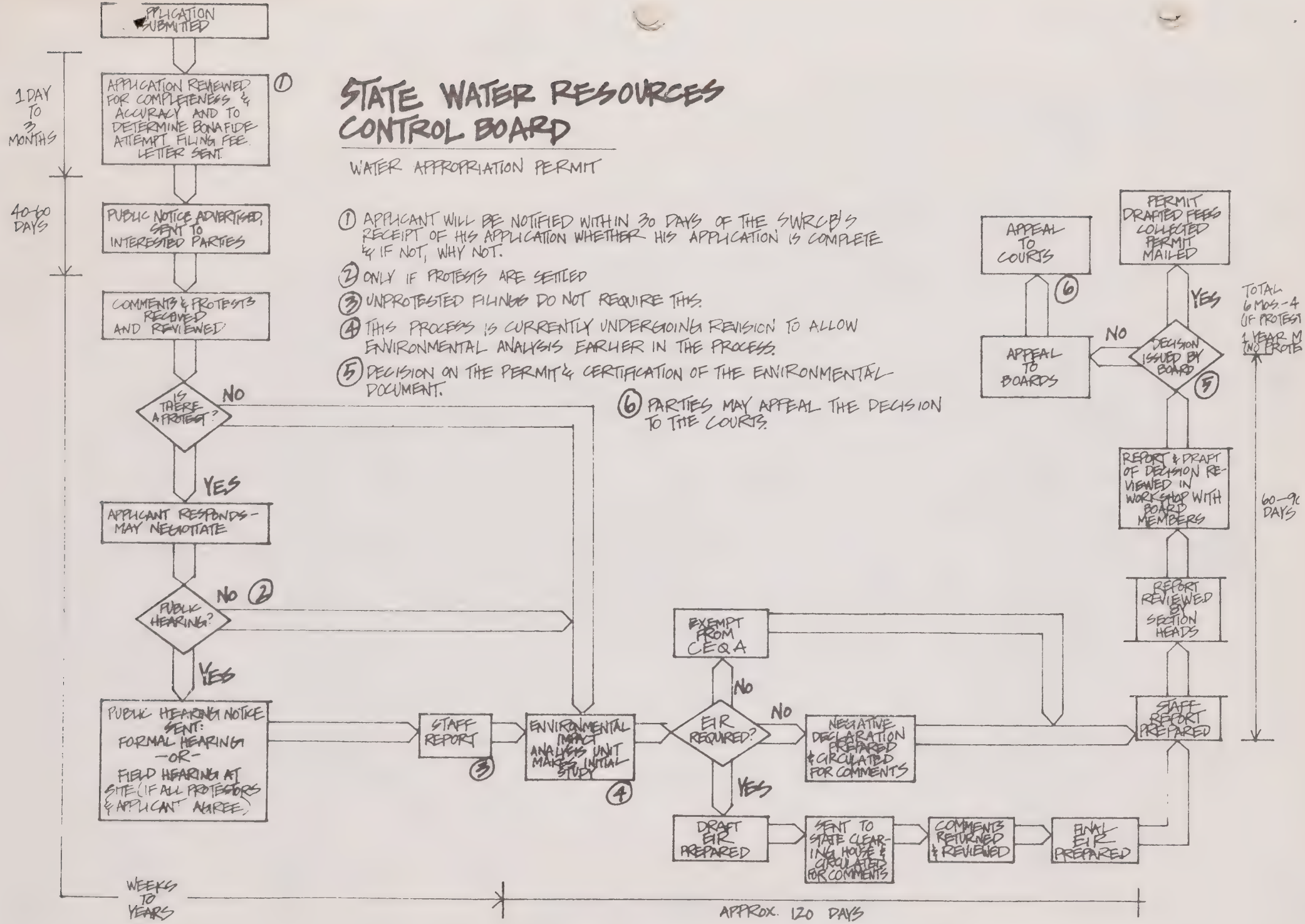


(1) IF S.L.C. IS THE LEAD AGENCY. IF NOT, THE ENVIRONMENTAL DOCUMENT PREPARED BY THE LEAD AGENCY WILL BE USED

(2) ENVIRONMENTAL DOCUMENT CERTIFIED HERE

STATE WATER RESOURCES CONTROL BOARD

WATER APPROPRIATION PERMIT



① APPLICANT WILL BE NOTIFIED WITHIN 30 DAYS OF THE SWRCB'S RECEIPT OF HIS APPLICATION WHETHER HIS APPLICATION IS COMPLETE & IF NOT, WHY NOT.

② ONLY IF PROTESTS ARE SETTLED

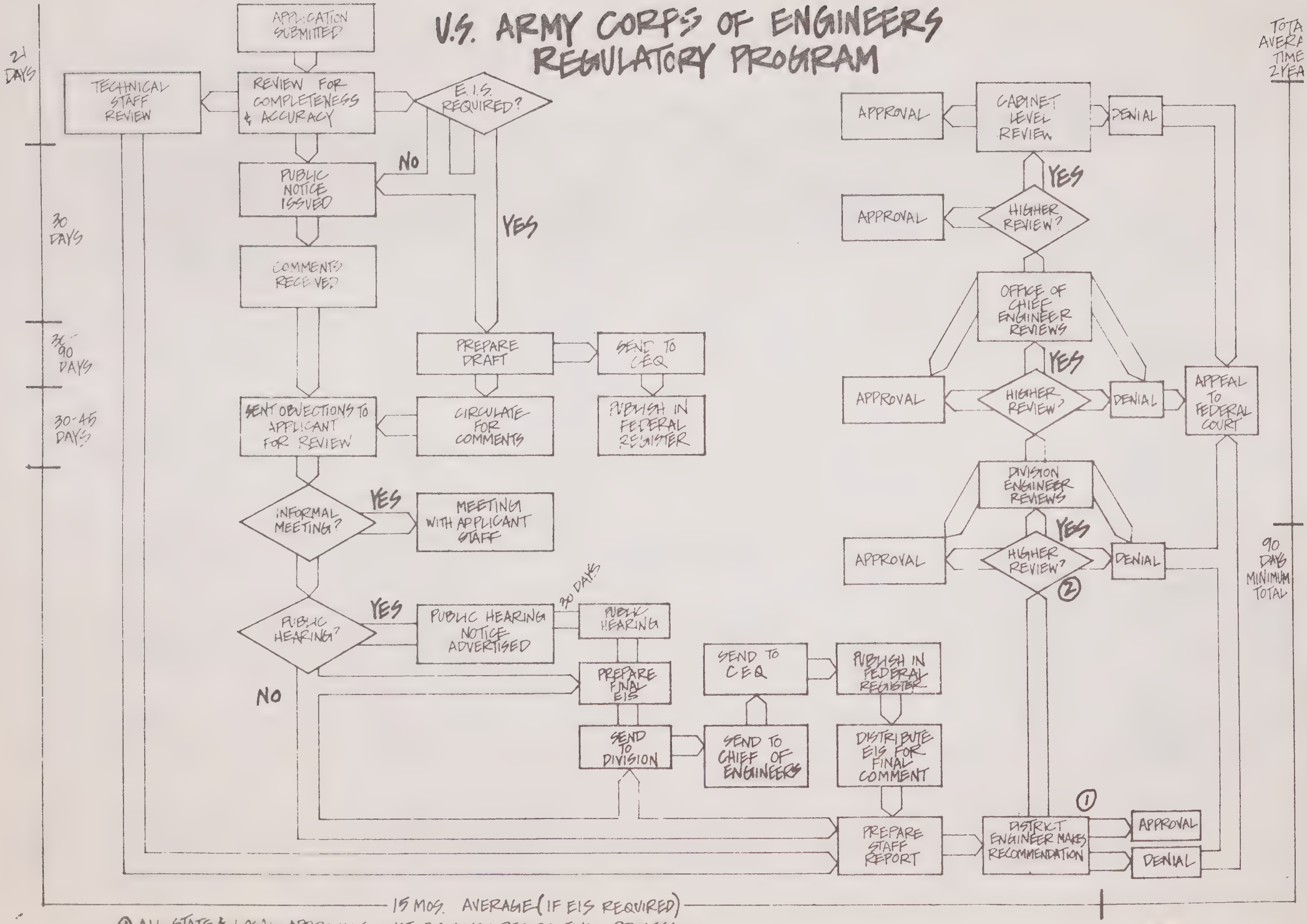
③ UNPROTESTED FILINGS DO NOT REQUIRE THIS.

④ THIS PROCESS IS CURRENTLY UNDERGOING REVISION TO ALLOW ENVIRONMENTAL ANALYSIS EARLIER IN THE PROCESS.

⑤ DECISION ON THE PERMIT & CERTIFICATION OF THE ENVIRONMENTAL DOCUMENT.

⑥ PARTIES MAY APPEAL THE DECISION TO THE COURTS.

U.S. ARMY CORPS OF ENGINEERS REGULATORY PROGRAM



15 MOS. AVERAGE (IF EIS REQUIRED)

(1) ALL STATE & LOCAL APPROVALS MUST BE GIVEN BEFORE FINAL PROCESSING

(2) MOST PROJECTS ARE DECIDED AT THE DISTRICT LEVEL. HOWEVER, DEPENDING ON THE CONTROVERSIAL NATURE OF THE PROJECT, THE DECISION MAY BE MADE AT A HIGHER LEVEL.

STATE DEPARTMENT OF HEALTH

AND

STATE SOLID WASTE MANAGEMENT BOARD

Both the State Department of Health and the State Solid Waste Management Board are currently revising their permit procedures to comply with two bills passed by the California State Assembly in 1977.

The pertinent sections of AB 1593* follow:

Article 9. Permitting of Facilities

25200. The department shall issue permits to use and operate facilities which in the judgment of the department meet the standards and requirements adopted pursuant to Section 25150.

25201. Three months after the department adopts standards and requirements pursuant to Section 25150, no operator of a treatment facility, waste transfer station, waste storage area, resource recovery facility, or waste disposal site shall accept or dispose of a hazardous waste unless the operator holds a valid permit from the department to use and operate such facility, station, area, or site.

25202. Compliance with conditions on the permit and with regulations adopted by the department pursuant to this chapter shall be required to sustain the validity of the permit. The department may impose conditions on the permit, including, but not limited to, the types of hazardous wastes which may be accepted or disposed of, special operating conditions, and changes in the operation of the permitee necessary to comply with the requirements promulgated pursuant to this chapter.

25203. Three months after the department adopts standards and requirements pursuant to Section 25150, it shall be unlawful for any person to dispose of a hazardous waste except at a disposal site or facility of an operator who holds a valid permit from the department to use and operate such site or facility.

*The department is the State Department of Health.

25204. Any solid waste facilities permit issued pursuant to Article 2 (commencing with Section 66796.30) of Chapter 3 of Title 7.3 of the Government Code by the department or by the county health entity shall, if it contains requirements that the department specifies, satisfy this article's requirements for a permit.

The pertinent sections of AB 2439* follow:

Article 2. Permit and Inspection Program

66796.30. (a) Any person operating a solid waste facility under an approved land use permit or under other equivalent local approval dated prior to August 15, 1977, shall file a notice of operation with the appropriate enforcement agency by August 15, 1977. If the operator was operating the facility prior to August 15, 1977, and is in compliance with the state minimum standards for solid waste handling and disposal and any applicable local ordinances and regulations, a solid waste facilities permit shall be granted.

(b) Any person who proposes to become an operator of a solid waste facility after August 15, 1977, shall file with the enforcement agency having jurisdiction over such facility an application for a solid waste facilities permit at least 120 days in advance of the date on which it is desired to commence operation.

(c) The operation of a solid waste facility by any person except as authorized pursuant to a solid waste facilities permit is prohibited.

(d) When the operator of the disposal site is not the disposal site owner, the disposal site operator's application for a solid waste facilities permit shall contain any information that the board may require regarding the disposal site owner's interest in the real property utilized as the disposal site.

(e) After August 15, 1977, no operator of a solid waste facility shall make a significant change in the design or operation of any such facility except in conformance with the terms and conditions in a solid waste facilities permit or revised permit issued to such operator. If the operator wishes to modify the operation of a solid waste facility, the operator shall file an application for revision of the existing solid waste facilities permit. The application shall be filed at least 120 days in advance of the date when the proposed modification is to take place. Under circumstances which present an immediate danger to public health, as determined by the governing board of the enforcement agency, the 120-day filing period may be waived by the governing board.

(f) Any person who is the owner of a disposal site which is in operation after August 15, 1977, shall file with the enforcement agency having jurisdiction over the disposal site a report specifying

* The "board" is the State Solid Waste Management Board.

the date when he encumbered, sold, transferred, or conveyed, or permitted to be encumbered, sold, transferred or conveyed, by agreement for sale, or in any other manner, his interest or any portion thereof in the real property utilized as the disposal site. Such report shall be filed within 30 days after any such sale, transfer or conveyance.

(g) Each report and application filed under this section shall be submitted under oath or under penalty of perjury.

(h) Each report, notice, and application filed under this section shall be submitted on a form approved by the board.

(i) Each application required to be filed under this section shall be accompanied by a filing fee according to a fee schedule established by the enforcement agency to reflect the cost of processing such applications. Any filing fee established by the enforcement agency shall be subject to approval by a majority vote of its local governing body and may not exceed an amount of five hundred dollars ($500). This fee is in addition to the fee authorized by Section 66796.20.

66796.31. The board may adopt classifications of solid waste facilities which the enforcement agency may exempt for the purposes of requiring permits under the provisions of subdivisions (a), (b), (c) and (d) of Section 66796.30. The enforcement agency may grant exemptions after a public hearing if all of the following findings are made:

(1) The exemption is not against the public interest.

(2) The quantity of solid wastes is insignificant.

(3) The nature of the solid wastes poses no significant threat to health, safety, or the environment.

66796.32. (a) Upon receipt of an application or report required by Section 66796.30, the enforcement agency shall submit a copy of such application or report to the board within seven days.

(b) The enforcement agency shall not issue, modify, or revise a solid waste facilities permit unless it has at least 45 days in advance, provided the board and the applicant with a copy of the proposed permit which shall contain the terms and conditions the enforcement agency proposes to establish.

(c) A decision to issue or not issue the permit shall be made by the enforcement agency within 120 days of the time application is filed unless waived by the applicant.

(d) The board shall, in writing, concur or object to the issuance, modification, or revision of any solid waste facilities permit within 20 days of the board's receipt of any proposed solid waste facilities permit submitted under subdivision (b) of this section. If the board determines that the permit would not be consistent with the county solid waste management plan or the state standards, it shall object to provisions of the permit, and shall submit such objections to the enforcement agency for its consideration. If the board fails to concur or object in writing within such 20 days it shall be deemed to have concurred in the issuance of the permit as submitted to it.

66796.33. (a) The enforcement agency in issuing, modifying or revising any solid waste facilities permit shall ensure that primary consideration is given to preventing environmental damage and that the long-term protection of the environment is the guiding criteria. To achieve these purposes the enforcement agency may prohibit or condition the handling or disposal of solid waste to protect, rehabilitate or enhance the environmental quality of the state or to mitigate adverse environmental impacts. Where an operator holds a permit issued under subdivision (a) of Section 66796.30, it shall be considered controlling, and no condition imposed under this section shall be more restrictive than the terms of the permit issued under subdivision (a) of Section 66796.30.

(b) The enforcement agency may include in a solid waste facilities

permit a reasonable time schedule for existing facilities for compliance with the standards adopted by the board and standards and conditions contained in the approved county solid waste management plan.

(c) Any permit may be suspended, modified, or revoked by the enforcement agency after a hearing for cause including, but not limited to, any of the following:

(1) Intentional or negligent violation of any term or condition contained in the permit.

(2) Obtaining the permit by misrepresentation, or failure to disclose fully all relevant facts.

(d) Any solid waste facilities permit issued, modified, or revised under this chapter shall be reviewed and, if necessary, revised at least every five years.

66796.34. (a) Upon compliance with the provisions of Section 66796.32 and after any necessary hearing, the enforcement agency may issue, modify, or revise a solid waste facilities permit if the board has concurred in the permit and if the enforcement agency, in the permit, makes both of the following findings based on substantial evidence:

(1) The proposed solid waste facilities permit is consistent with the county solid waste management plan prepared under Section 66780.

(2) The proposed solid waste facilities permit is consistent with the standards adopted by the board.

The permit shall contain all terms and conditions which the enforcement agency determines to be appropriate for the operation of the solid waste facility. The operator shall comply with all terms and conditions of the permit.

(b) Within 15 days of issuing, modifying, or revising a solid waste facilities permit, the enforcement agency shall transmit to the disposal site owner and the person who is or proposes to become an operator of a transfer/processing station or a disposal site, or both, a copy of the solid waste facilities permit.

66796.35. (a) An enforcement agency or the board in issuing or reviewing any solid waste facilities permit or in connection with any action relating thereto or authorized by this title, may investigate the operation by any person of a transfer/processing station, or disposal site, collection or handling equipment, or storage area for solid wastes within its jurisdiction.

(b) In such an investigation, the enforcement agency or the board may require that any person who is or proposes to become an operator of a transfer/processing station, disposal site, collection or handling equipment, or storage area for solid wastes within its jurisdiction, shall furnish, under penalty of perjury, such technical or monitoring program reports or other reports as the enforcement agency may specify.

(c) In such an investigation, the enforcement agency or the board may inspect the facility, equipment, or vehicle used for storage, collection, transportation, processing, or disposal of solid waste, as necessary to ensure compliance with this title and that solid waste facilities permits are being complied with. Such inspection shall be made with the consent of the owner or possessor of such facilities or, if such consent is refused, with a warrant duly issued pursuant to the procedure set forth in Title 13 (commencing with Section 1822.50) of Part 3 of the Code of Civil Procedure; provided, however, that in the event of an emergency affecting the public health or safety such inspection may be made without consent or the issuance of a warrant.

66796.36. Upon the request of any person furnishing any report, notice, application or other document required by this chapter, the board or the enforcement agency shall not make available for inspection by the public those portions of such report, notice, application or other document which contain trade secrets as defined in subdivision (3) of Section 499 of the Penal Code; provided, however, that such portions of a report, notice, application, or other document shall be made available to government agencies for the use in making reports and to the state, any state agency, or the enforcement agency in judicial review for enforcement proceedings involving the person furnishing the report. Nothing in this section shall prohibit the disclosure of information pursuant to Chapter 3.5 (commencing with Section 6250) of Division 7 of Title 1 of the Government Code.

APPENDIX E

EXCEPTS FORM THE REPORT OF THE FEDERAL TASK FORCE FOR HAZARDOUS MATERIALS MANAGEMENT OF THE WESTERN FEDERAL REGIONAL COUNCIL, REGION IX, ENVIRONMENTAL PROTECTION AGENCY

Excepts from this report have not been included because the report has not yet been released.

The report should be available by February 1978.

APPENDIX F

TESTIMONY OF YVONNE SAN JULE

ASSOCIATION OF BAY AREA GOVERNMENTS

STATEMENT TO THE

ASSEMBLY COMMITTEE ON RESOURCES, LAND USE AND ENERGY

Presented by Yvonne San Jule
Acting Director, Comprehensive Planning

The Litter Control, Recycling and Resource Recovery Act of 1977 (SB 650) establishes a welcome revenue source to enable the State and local governments to supplement and implement the planning done under the Solid Waste Management and Resource Recovery Act of 1972.

ABAG appreciates the opportunity to contribute comments on priorities and criteria for distributing California Pollution Control Financing Authority and SB 650 funds for equipment and projects to recover materials and energy resources from solid waste.

I. Allocation of Funds by California Pollution Control Financing Authority. Two areas where loans to individual businesses would have maximum impact on reducing pollution, cutting down on wastes disposed of in landfills and recovering reusable materials from solid waste are:

A. To small businesses that generate hazardous wastes:

Equipment that processes hazardous industrial wastes, either to neutralize before discharging to sewers, or to recover reusable materials can be extremely costly--often too costly to be justified by savings in land disposal costs or profits from sale of recovered materials. Again, because of costs, many small businesses do not have facilities for separate storage of wastes that would facilitate

recycling or pretreatment for discharge to sewers.

One dramatic example: There is long-standing recognition of the beneficial effects of the use of sewage sludge on marginal agricultural land. The presence of heavy metals--particularly cadmium--in sludge, with the potential that it may enter the human food chain in amounts dangerous to health, is currently receiving a great deal of attention. Regulations setting limits on cadmium levels in sludge for agricultural use may severely limit the use of sludge in some areas. In the Bay Area, where sewage sludge has high cadmium levels, the principal source of the metal is electroplating shops. Most of them are small. Technology is available for recovering cadmium before wastes are discharged to sewers, but the cost is so high it would put these shops out of business. CPCFA assistance in the purchase of such equipment would not only enable reclamation of cadmium for reuse but would make sewage sludge safe for growing crops. Considering that when all of the wastewater treatment facilities required by the Federal Water Pollution Control Act are completed in the Bay Area, sewage sludge quantities will increase two- to five-fold, the secondary beneficial effects of reducing the cadmium content is of considerable magnitude. Most of the cadmium-contaminated sludge will otherwise have to be disposed of in landfills or on dedicated lands.

While most investments in recovery equipment or separate storage facilities by small businesses would not have such a high payoff,

they would still result in significant recovery of hazardous wastes and reduction of wastes being buried in landfills.

B. To create dependable markets for source or mechanically separated materials (bottles, glass, ferrous metals, aluminum, newsprint, corrugated cardboard, etc.) in major economic regions in the State, by:

- assisting existing recycling industries to expand operations to accommodate the total regional output of recycling and recovery programs, or
- assisting new industries to be established in regional market areas to accommodate the secondary materials supply.

Development of recycling parks would be an extension of this idea.

II. Allocation of SB 650 Funds by State Solid Waste Management Board

A. Funding priorities should be based on the quality of the program, as evidenced by:

- the strength of commitment of the local community or communities to a long term comprehensive program.
- active involvement or support of the private sector.
- well-thought out, business-like approach, leading to self-sufficiency.
- initial volume or variety of materials is not as important as a plan for phased expansion of volume and broadening of range of items as economic feasibility is established.

B. Maximum volume of resource recovered should never be the lone criterion. Long-term availability of a dependable market is another factor. In the matter of energy production a great many environmental considerations must be satisfied. Any waste to energy facility must have costly technological modifications to meet air and water quality control requirements. A large-scale waste-to-energy facility would be feasible only in areas where a sizeable population (500,000 and up) is concentrated in a fairly small geographic area. If wastes have to be transported from a wider area, costs go up, net energy output is reduced by transportation fuel requirements, air impacts--from additional vehicle trips--go up. Traffic congestion may be a problem. Waste-to-energy projects should be looked at as an environmentally sound waste management method that produces a certain amount of energy as a saleable product, not as a solution to the energy shortage. The project size should be appropriate to solving the solid waste problem of the jurisdiction or jurisdictions it serves.

C. Priority should be given to projects that coordinate and offer economies of scale to several recycling or mechanical processing centers--in collection, warehousing and delivery to buyers. Transportation costs are often the cause of recycling center failure. Coordination of transportation cuts down costs, reduces vehicle trips between centers and buyers, means less traffic congestion, less mobile source air pollution, and conserves fuel.

D. Special attention should be paid to projects to investigate beneficial solutions to unsolved waste management problems such as automobile tires, demolition and construction debris.

E. Section 68047 provides grants for recycling centers with the stipulation that funds not be used for salaries or wages. Whatever the reason, it seems short-sighted. Recycling centers can offer employment opportunities to those with the greatest difficulty in obtaining work--young people with limited skills, the physically and mentally handicapped, retired people on low, fixed incomes, offenders, probationers, etc. Further, to be successful, a recycling center cannot rely on volunteer management. It has to be run as a business by full-time, qualified people.

F. Both the State Solid Waste Board and the Pollution Control Financing Authority should look at innovative programs--mixed residential-commercial-industrial development where energy from wastes supplies heat to the complex and power to run the industries.

G. Section 68051 provides grants for programs that are not of a recycling center nature. Presumably these would be programs of a clearinghouse type, where waste products pass directly from generator to consumer. Such a clearinghouse could bring recycling center representatives into direct contact with recycling industries.

Two existing programs concerned with materials other than those household items dealt with in recycling centers are worthy of support by SB 650 funds:

1. the industrial waste exchange program being carried on on a limited scale by the State Department of Health. With additional support, this program could make great strides in reducing the land disposal of hazardous wastes and augmenting the recycling of material resources.

2. the Bay Area Creative Recycle--a consortium of school district representatives, community arts, recreation and social services staffs, and non-profit group representatives from all nine Bay Area counties. Their objective is to establish a network of depots throughout the Bay Area. The depots would receive left-over scrap and mill ends from manufacturing industries (that are now being hauled to landfills), and make them available to school teachers, community leaders of art and recreation programs and non-profit organizations. One such depot exists in San Francisco. Parents and teachers have been picking up materials on an informal basis for years. Assistance in creating a network of centers would save industries hauling costs to landfills, school and community programs with tight budgets would receive free educational, art and craft materials, and the erstwhile wastes would receive at least a second use before they enter the waste disposal system.

H. From either the CPCFA or SB 650--or both--funds should be available for purchase of scales at all landfills--whether publicly or

privately owned and operated. Every public agency and private organization in the State that is trying to understand the solid waste problem and plan for conservation and recovery of resources from wastes needs an accurate data base about quantities and characteristics of wastes.

* * *

While it is not on the agenda of this two-day hearing, I have appended some comments about the litter abatement grant programs in SB 650. We've examined the legislation both from the standpoint of the local governments that will receive the grants and from the State Solid Waste Management Board that will be administering the grant program. We were struck by technical problems in the provisions of the Act that may make these grants almost impossible to administer. In any event, they will entail additional administrative costs at the State level, they overlook the structure for planning and implementing litter management programs at the countywide level that was mandated by SB 5, and they will delay the availability of funds for local litter abatement activities. The Act provides funds for a number of litter control programs: cleanup of recreational lands and litter along public thoroughfares, purchase and placement of litter receptacles, educational programs and improved enforcement of litter control laws. A separate percentage of the total revenues to be raised by the bill is designated for each of these four programs. Each program is then broken down between State and local agencies. In some cases the percentage breakdown is specified; in others

it is not. In two of the programs, two different two-part formulas are established for allocating the local share among the counties in the State. For these two programs, the Act then goes on to specify a choice between two methods of distributing the funds within each county--among the cities and the county.

These four litter-related programs represent 45% of the funds that will be available. Developing four sets of guidelines, sorting out the complex of specifications for allocating funds, making grants and monitoring the project over the grant period add up to a mass of administrative detail at the State level. And this is in addition to responsibilities of the State Solid Waste Management Board related to the recycling and resource recovery grant provisions of the Act. As it now stands this condition would prevail every year for five years. We have some suggestions for simplifying administration while retaining the percentage distribution of funds among the four programs specified in the legislation and fulfilling the intent of the Legislature that the funds be substantially expended each year.

Combining these four programs would make 45% of the proceeds of the Act available for a comprehensive approach to litter management at the State and local levels, using existing governmental mechanisms.

- Establish division of the funds between the State Solid Waste Management Board and the countywide Solid Waste Management Agencies in each county formed pursuant to SB 5.

- The State share of the funds would be expended by the SWMB, as the lead agency, on developing a state-wide comprehensive litter abatement program for State and Federal park and recreation lands and freeways and highways. The Departments of Parks and Recreation, Transportation and Fish and Game, and the California Conservation Corps would participate in developing the program--and implement it. The program would include litter cleanup in recreational areas and on freeways and highways, public education, enforcement and placement of receptacles, with the budget reflecting the percentage distribution set forth in SB 650.

The local share would be allocated among counties on the basis of a single formula which takes population into account but which gives more weight to factors indicating severity of the litter problem, such as local miles of public thoroughfares and the level (numbers of people) and intensity (days per year) of use of local park and recreation facilities. (Sparsely populated counties often offer recreational opportunities that attract heavy out-of-county use.)

Each county's share would be used by the countywide solid waste management agency to implement the litter abatement element of the mandated countywide solid waste management plan, with the budget distributing funds for litter cleanup in local parks, on streets and highways, public

education, enforcement and litter receptacles, according to the percentage distribution set forth in SB 650. A staff technical advisory committee for the litter program in each county should include local public works and parks and recreation staff.

I hope that these suggestions will be useful to the Committee and to the Solid Waste Management Board in developing guidelines for the administration of SB 650.

ASSOCIATION OF BAY AREA GOVERNMENTS

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